Appendix B: Biological Resources

Appendix B-1: Weed Management Plan

2011

Searchlight Wind Farm Weed Management Plan

Alphabiota Environmental Consulting

Alphabiota
ENVIRONMENTAL CONSULTING

Weed Management Plan
Searchlight Wind Farm
Town of Searchlight,
Clark County, Nevada

April 11, 2011
Revised November 8, 2011

Prepared for:
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Alphabiota
ENVIRONMENTAL CONSULTING

Weed Management Plan

Searchlight, Nevada

Clark County, Nevada

Alphabiota Environmental Consulting, LLC
Project Number: 09-1034

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1.0 INTRODUCTION

1.1 Plan Purpose

The purpose of this plan is to prescribe methods to help prevent and manage the spread of noxious weeds during and following construction of the Searchlight Wind Energy Project in Clark County (Project). The Project Proponent and its contractors are responsible for carrying out the methods described in this plan. This plan is applicable to the construction and operation of the Project, but may be modified, with consultation of the LVFO weed coordinator, to address circumstantial and potentially unforeseeable issues not readily predictable prior to construction or operation activities. Noxious weed control practices for the Project described in this plan have been developed utilizing the following sources and agency contacts.

Nevada:

- Nevada Revised Statutes: Chapter 555—Control of Insects, Pests and Noxious Weeds;
- The Las Vegas Field Office of the Nevada State BLM; and
- The Nevada Department of Agriculture.

1.3 Goals and Objectives

The goal of the preventative and control measures outlined in this document is to promote the containment and control weeds during the construction, operation, and maintenance of the Project. The Project Proponents objective is to assist federal, state, and local agencies' weed control efforts, to comply with requirements designed to help prevent the spread of all weeds, noxious and other, and to implement weed control measures on areas of the Project that are identified to be of special concern. In carrying out these measures, the Project Proponent will target selected areas within the Project where weed species are problematic within the current natural vegetation community in comparison to the least disturbed or naturally occurring and currently described vegetation habitat occurring at or nearby the Project. These preventative and treatment measures are described in Section 3 of the Noxious Weed Management Plan.

1.4 Project Description

Duke Energy (Project Proponent) is proposing the development of the Searchlight Wind Energy Facility (Project) that includes the erection of 87 wind turbines with supporting infrastructure, transmission lines, distribution lines, and collection lines within the proposed Project area.

The proposed Project area includes locales within the rural outskirts to the north, east, and south of the town of Searchlight within the County of Clark, Nevada (Plate 1). The site is located within the Searchlight (35114d8), Fourth of July Mountain (35114d7), Ireteba Peaks (035114e7) Nelson SW (35114e8) 7.5 Minute United States Geological Survey Quadrangle. The overall Project boundary (Plate 2) encompasses approximately 9500 acres of BLM managed lands of which approximately 2260 acres of this land was surveyed for potential ground disturbance and development. Most of the site and the surrounding vicinity is currently undeveloped, and / or is managed by the BLM, with some of the site containing off-road vehicle trails. To complete the botanical and weed survey effort with the highest degree of accuracy prior to final Project design, a 400-foot survey corridor was created by utilizing a 200-foot buffer around the proposed center line of turbine strings, roads, collector lines, and transmission lines. Additionally, other features such as the O&M building, substation, and lay-down area were buffered by 200 feet from their outer edges, leaving a survey area of greater than 400 feet for non-linear features. At the time of this report, the survey corridors are found exclusively within the Project boundary and represent the areas of potential development.

2.0 NOXIOUS WEED INVENTORY

2.1 State Listed Noxious Weeds and Relevant Regulations

The State of Nevada and US Department of Agriculture maintains an official list of weed species that are designated noxious for the State (Table 1). The Nevada Control of Insects, Pests, and Noxious Weeds Act (Nevada Revised Statutes: Chapter 555) grants the Director of the Nevada Department of Agriculture the authority to investigate and

control noxious plants. The following excerpts from the Nevada Revised Statutes (NRS) Chapter 555 and the BLM website are presented for reference in establishing relevant guidance for this plans development.

Noxious weeds as defined by the BLM

Noxious weed is a legal and regulatory designation. The BLM defines a noxious weed as: "A plant that interferes with management objectives for a given area of land at a given point in time." 'All of Nevada's noxious weeds can be found somewhere on Nevada's public land. Thus, in addition to BLM's inherent stewardship concerns about noxious weeds, legal responsibilities towards noxious weed management exist' (BLM, 2009).

The State of Nevada has officially designated 47 weed species as noxious and categorized by distribution (Table 1). For the purposes of this Weed Management Plan, all weeds on the list will be treated with equal importance for control and/or eradication.

2.1.1 Naturalized and Established Non-Native Species of Plants

The basis for weed management and the Project Proponent's objective is to prevent the spread of controllable weeds. The Project Proponent, the BLM, and other Federal, state, and local agencies recognize that there are species, such as Cheat grass (*Bromus tectorum*), Mediterranean grass (*Schismus spp.*), and other herbaceous and woody species that because of their widespread distribution are not considered feasible for general control. Therefore, only those species that are identified as controllable will be treated in the selected areas of the Project where they are problematic and form a significant portion of the local community, and / or pose a threat to the local vegetation community or nearby undisturbed areas, or could increase the probability of wildfire if left untreated.

2.2 Weed Management of the Project

The Project Proponent will maintain and control, within feasibly practicable means, weeds and weed infestations within Project boundaries, Project influence areas, and Project construction areas as prescribed by *NRS 555.150 Eradication of noxious weeds by owner or occupant of land***.**

Project influence areas are defined as those areas which may occur within or outside construction zones and their buffer areas, Project boundaries, or downstream within desert washes outside the Project boundaries but not extending more than 50 meters from the Project boundary downstream of any wash system originating on or within the Project bounds. All other reasonably discernable weed infestations occurring outside the Project bounds or within the 50 meter wash limit will need to be discernibly identified as originating from Project weed source populations prior to the Project Proponent assuming responsibility for management of any weed infestations occurring outside the boundaries of the Project.

2.3 Weed Survey and Inventory within the Project Area

Pre-construction field surveys were conducted from February, 2010 through May, 2010 to identify potential weed occupation. A reconnaissance survey was conducted on November 11, 2009, and a cursory site visit was conducted on July 7, 2010 to assess pre-survey and post-survey blooming and vegetation conditions of the site. Survey results are presented in the botanical survey report prepared for this project, (Bissonnette 2010). Weeds identified for this project are discussed in the following section.

Survey teams discovered one noxious weed species that is generally considered a major concern for the Mojave Desert. Sahara Mustard (*Brassica tournefortii*), a category 'B' weed, is an introduced species. Survey teams observed Sahara Mustard in the northeast reaches of the Project, within a contiguous wash system (Plate 3); (Bissonnette 2010).

Observations of Sahara Mustard generally occurred as widely scattered individuals, where the majority of these individuals were surviving opportunistically under larger native nurse plants, and not as populations. Most of the Sahara Mustard observed on or within the vicinity of the site occurred along the boundaries of Rte 164 (Cottonwood Cove Road) and within the bisecting and adjacent wash that covers a large portion of the northeast reaches of the site. Seeds appear to be transported and perpetuated by normal traffic, roadside maintenance, recreational ATVs, maintenance vehicles, and runoff from precipitation events (Bissonnette 2010). Additionally, seed transport may occur from rodents who carry them for caching, and downhill rolling movements based on spherical shape.

3.0 WEED MANAGEMENT

A risk assessment (BLM 2009) prepared by Alphabiota Environmental Consulting, LLC was completed for this Project and was referenced for use in establishing protocols for the implementation of this plan. Based upon the results of the risk assessment, the risk rating for this project is Moderate. Pre-construction controls, preventative measures (during construction and post-construction) and during operations of the facility will be implemented.

The following sections describe implementation measures for weed management as developed in collaboration with the BLM LVFO weed coordinator. Additional weed control measures that may be necessary following the development of this Plan will be developed and agreed upon prior to the onset of ground disturbing activities in areas of concern that may not have been readily identifiable at the time this plan was developed. Additional measures will be noted either in this Weed Management Plan or by memorandum submitted to the Project Proponent and the BLM LVFO weed coordinator for their review and endorsement.

3.1 Recognition of Problem Areas

Prior to the initiation of construction activities, all construction personnel will be instructed on the importance of controlling weeds. As part of start-up activities, the Project Proponent will provide information and training regarding weed management. The importance of preventing the spread of weeds in areas not infested, and controlling the proliferation of weeds already present will be emphasized. Prior to construction, areas of concern previously identified will be identified and clearly discernable in the field, flagging will be utilized to help identify these areas of concern. The flagging will alert project personnel and prevent access into areas until weed management control measures have been implemented.

3.2 Preventive Measures

The Project Proponent recognizes that prevention is the most cost-effective approach to weed management. The Project Proponent will collaborate with federal, state, and local agency weed control efforts; comply with preventative requirements; and implement weed control measures in areas of the Project identified with weed concerns. The following preventive measures will be implemented to help prevent the spread of existing weeds found on the site and within the previously defined influence areas:

3.2.1 General

The Project Proponent will conduct an employee environmental awareness program (EEAP) before surface disturbance to educate all Project personnel regarding environmental concerns and requirements, including weed identification, prevention, and control methods. No personnel will be allowed to enter the Project before taking part in the EEAP, at any point during the Project. Qualified biological monitors or environmental inspectors approved by BLM and / or the U.S. Fish and Wildlife Service (FWS) will be used to conduct the EEAP program and on-site biological monitoring before and during construction, and during facility operation.

3.2.2 Cleaning

All project related vehicles and equipment will undergo a cleaning regiment prior to entering or leaving the project area. Cleaning will be carried out using power or high-pressure equipment to remove seeds, roots, rhizomes, or any plant material from the equipment before transport on or off-site. Cleaning will concentrate on tracks or tires and on the undercarriage, with special emphasis on axles, frames, cross members, motor mounts, the underside of running boards, and front bumper/brush guard assemblies. If the weather and site conditions for each day of construction activities are dry, compressed air will be used to clean vehicles and equipment. If muddy conditions exist, a mat platform with containment would be set up and the vehicles and equipment will be cleaned with high pressure water. Vehicle cabs will be swept out and refuse disposed of in waste receptacles. The contractor, with oversight from an environmental inspector, will ensure that vehicles and equipment are free of soil and debris capable of transporting weed seeds, roots, rhizomes, or other plant material before vehicles and equipment are allowed use of Project access roads.

The project will develop a 'sticker' program to identify all vehicles and equipment that have successfully been cleared of weed and plant material and soil. Vehicles and equipment without the proper area-specific stickers will be barred from entering Project areas until cleaned. All vehicles and equipment will always be cleaned prior to entering the Project site or when moving to an area of the site not identified within the immediate vicinity of weed infested areas. Cleaning will be verified by a biological and / or environmental monitor. Vehicles leaving the site will have to be re-cleaned and validated prior to re-entering the Project.

Cleaning sites will be coordinated with BLM LVFO weed coordinator and then recorded on maps and / or by GPS equipment. Final maps of locations will be made available to the BLM LVFO weed coordinator or other jurisdictional authority upon request.

3.2.3 Soil

In areas where infestations were identified in the field, the contractor will salvage vegetation required while topsoil will be stripped and stockpiled to eliminate the transport of soil-borne weed seeds. Stockpiles would be marked with clearly visible signage until needed for reclamation. These soils will also not be permitted to be moved outside of the weed infested areas from which they were excavated. When needed, stockpiled materials will then be returned to the areas from which they were excavated.

In addition to soils and materials stockpiled from on-site resources, soils and materials transported into or onto the site from out-side sources will be inspected, assessed for weed contamination, and managed according to on-site soils treatments and / or stockpiling treatments. To minimize the probability of introducing weed non-native species to the site from imported topsoil, the following measures will be implemented:

- Inspection of the source site will be performed to assess weed species existing at and within the immediate vicinity of the source location.
- Fill material will be utilized only from source sites without weed infestation.

Straw or hay bales used for sediment barrier installations or mulch distribution will be weed-free. If weed free bales are unavailable, alternative weed free sediment barrier installations would be utilized.

The Project Proponent will implement the reclamation of disturbed lands immediately following construction that will be outlined in the Project Proponent's Reclamation Plan. Prompt and continuous re-vegetation efforts will ensure adequate vegetative cover to help control or prevent the introduction of weeds.

3.3 Treatment Methods

The Project Proponent will implement weed control measures in accordance with existing regulations and jurisdictional land management agency. The Project Proponent will focus weed control efforts only within areas of the Project or designated buffer zone

areas containing *Brassica tournefortii*. Treatment methods will focus on *Brassica tournefortii* occurring within the Project or designated buffer zones. The BLM LVFO weed coordinator will be notified prior to treatment of *Brassica tournefortii*.

The following treatment measures will be utilized to manage the control and / or spread of *Brassica tournefortii*. Implementation of weed control measures will proceed when site conditions are determined to be best suited for the type of weed control method being utilized.

- **Mechanical:**

  This treatment method will utilize either of the following strategies with the first method being the preferred choice:

  1. Manual labor personnel utilizing hand tools to remove weed species.

  Labor methods, such as hand pulling and / or use of hand tools to remove unwanted weed species, will be implemented to target small populations of *Brassica tournefortii* thus limiting or avoiding the removal of pre-existing native species. This method will be utilized prior to seed set and will be useful in controlling *Brassica tournefortii* that occur in locally small populations or occur as individuals beneath nurse type plants. Excavated *Brassica tournefortii* will be prepared for removal from the site.

  2. Heavy equipment utilizing implements to remove *Brassica tournefortii* and clear surface soils.

  Mechanical methods relying on heavy equipment (e.g. tractors, dozers, earthmoving equipment, etc.) will be implemented to mow, disc, or excavate *Brassica tournefortii* populations. This method will be utilized if it is determined that the area to be treated is too large to control sufficiently by manual labor methods alone. If such a method is used, restoration will occur to restore the affected areas. Restoration methods developed in the Restoration Plan will need to be followed after any use of this type of treatment method.

- **Chemical:**

  This treatment method would only be used if approval is gained by BLM and in conjunction with an approved Pesticide Use Proposal (PUP). Chemical treatment, if utilized, would be used to control the spread of *Brassica tournefortii* prior to seed set. Pre-emergent herbicides would be applied to the soil before the weed seed germinates. The Project proponent would utilize BLM-approved pre-emergent herbicides (Appendix C) if chemical treatment was deemed appropriate and BLM approval is confirmed. Pre-emergent herbicides would primarily be applied in early fall, prior to fall/early winter rains and weed germination. Species specific herbicides would be investigated and would be used as appropriate and available, thus targeting specific weed species rather than all plant growth.

Pre-construction treatment will consist of one or both of the mechanical methods, and when applicable, chemical methods. Treatment will occur only in areas where populations of *Brassica tournefortii* have been documented. In areas where *Brassica tournefortii* may be interspersed with native vegetation, the method of choice will be manual labor using hand tools prior to seed set for the removal of excavated *Brassica tournefortii*. During construction, control and containment preferences will be to utilize manual labor whenever feasibly or logistically possible. To help support control and containment efforts during post-construction activities mechanical applications will be utilized to help reduce infestations and fecundity of any opportunistic weed species recognized by the State as a weed. Chemical applications will be reserved for use if mechanical methods are not successful, and only with prior BLM approval.

As with other Weed species occurring in the West; *Brassica tournefortii* can be aggressive and highly adaptable while utilizing rapid germination, maturity, and fruiting strategies well before other native species begin to germinate. *Brassica tournefortii* is an annual herbaceous plant that reproduces by seed. It is self-compatible or autogamous, meaning that it can self-pollinate. Seed maturity and senescence generally occurs from April to May, however during drought conditions this can occur as early as February (Guertin 2003). Germination can occur bi-annually (generally in the spring and / or fall) if the necessary environmental conditions occur. *Brassica tournefortii* seed requires light inhibition and optimum soil temperatures ranging from 59°- 68°F (15°-20°C) for

germination to occur. Germination can occur within 4 days under optimum conditions. As little as 1.5 inches of rain can initiate germination and growth. Most growth occurs in the winter months with flowering and fruiting occurring in the late winter to early spring months. However, this can be accelerated by unseasonably warm dry weather, a short rainy season, or a rapid warming and heating of a locale. Therefore, the monitoring of environmental, climatic, and emergence conditions is necessary for preparing for implementation of weed control and restoration treatments.

To help facilitate implementation of treatments the Project Proponent will employ a biological monitor to routinely monitor and record the site conditions for indications of growth of *Brassica tournefortii*. This will include monitoring of local climate conditions for rainfall and general weather conditions. Monitoring will begin up to one year prior to the anticipated start date of ground disturbance activities for the Project. The biological monitor will record and document the conditions of the areas to be treated and convey the documented conditions to the Project Proponent and / or the contractor assigned to managing treatment measures. This will help to facilitate logistical scheduling for proceeding with treatment methods for *Brassica tournefortii*. Reporting will be submitted to the Project Proponent; and will be provided to the BLM LVFO upon request.

3.4 Reclamation Methods

Reclamation work, performed in advance of dormant seeding, will follow the progress of construction. Restoration and re-vegetation methods to be carried out by the Project will be addressed in a Reclamation Plan prepared by the Project Proponent. Disturbed ground may require BLM-approved chemical weed control before weeds go to seed. Chemical weed control would only be used with BLM approval and in conjunction with an approved PUP. Reseeding that may include mulching will be conducted on disturbed areas that have reached final grade or that will remain un-worked for 30 days. Final seedbed preparation, as required, and seeding and planting would be completed in September and October of the construction period to coincide with the optimal periods for dormant seeding for seed mixtures to be used for the Project. Weed control is an

important function for the restoration of native plant species following site disturbance. Planting and seeding will occur at the appropriate time of year for each species considered, and will be dependent upon weather conditions and construction timing. Planting methods will be developed based on site-specific factors such as slope, erosion potential, and size of the area in need of re-vegetation.

3.5 Post-reclamation Methods

Treatment methods other than herbicide application, such as mechanical measures, would be considered during the reclamation process to support weed control. Pre-construction weed management methods coupled with successful reclamation, treatment, and monitoring, should also help combat previously established weeds. During years of higher-than-average rainfall, weeds could appear in greater numbers than normal. For this reason, reclamation (through clearing, preparing seedbeds, and seeding of native species) of areas containing broadly occurring species is the preferred measure.

Treatment methods would be based on species-specific and area-specific conditions and will be coordinated with the BLM. The Project Proponent will continue to coordinate with resource agencies following construction and operation of the facility to ensure that appropriate and adequate treatment is implemented.

Post-construction control measures will include mechanical methods; utilizing manual labor, and / or equipment to extract, mow, or disc weed individuals or populations. Subsequent seeding would be conducted as soon as possible following soil disturbance to re-establish a stabilizing vegetation cover and reduce the potential for colonization of weeds. Such soil-disturbing activities would be avoided within native habitat areas.

3.6 Agency Specific Requirements

The appropriate weed control procedures, including target species, timing of control, and method of control, will be coordinated with the BLM LVFO weed coordinator. The Project Proponent will be responsible for providing the necessary personnel / contractors to implement weed control procedures.

4.0 MONITORING

Monitoring of weeds will be conducted during all phases of construction and for the life of the facility (Table 3). Monitoring will be conducted throughout the Project bounds and in any area affected by Project construction where known infestation areas have been identified to be of special concern. The Project Proponent intends to begin post-construction monitoring during the first growing season following construction. Post-construction monitoring will be conducted annually for the first three years following completion of construction activities and bi-annually for the duration of the life of the facility. Monitoring, both during construction and post-construction, will initially occur specifically during the life cycle or growing season of *Brassica tournefortii* (Most growth occurs in the winter months with flowering and fruiting generally occurring in the late winter to early spring months; see paragraph 3 section 3.3 for more information regarding *Brassica tournefortii* phenology and germination). However, if any other of the State listed weed species is observed within the project during the life of the facility, monitoring may be amended as needed. The growing season shall be defined by the germination time and documented growth cycle of each individual State listed weed species observed with the project for any given time during construction and post-construction operations and maintenance during the life of the facility. Therefore, monitoring times and conditions may change as needed and may vary from year-to-year.

If infestations of weeds are noted during monitoring activities, treatment methods will be implemented. In the event of any new infestation, the monitoring schedule may become more frequent. Small infestations are likely to be locally treated with one of the previously identified applications, with a focus on treating individual plants. In the event that a large infestation occurs or reoccurs, an assessment will be performed to determine the potential cause of the infestation, and new strategies for treatments may be developed. Any new treatment strategies will be collaborated with the BLM and other relevant local weed supervisory authorities.

The Project Proponent will maintain ongoing communication with BLM regarding weeds within the Project bounds. BLM may also contact the Project Proponent to report the presence of weeds. The Project Proponent would assess the conditions and locations for which the weeds are being reported and develop a plan to control the weeds on a case-by-case basis. The Project Proponent will maintain experienced personnel with background in the identification of weed species, who will convey information to the biological monitor for contribution into the monitoring reports.

4.1 Proposed Monitoring Methodology

The overall purpose of a monitoring program is to document whether areas that have been disturbed during construction and / or post construction are progressing toward the long-term goal of soil stability, appropriate re-growth of (weed free) vegetative cover, species diversity, and habitat restoration. Monitoring will be carried out as described below.

Targeted weed treatment areas where reclamation is implemented or have been treated will be monitored and assessed biannually for the life of the facility following construction. The Project Proponent will implement the schedule on any appropriate BLM, state-owned, and private lands where monitoring would include:

- Identifying and assessing weed conditions in the primary and secondary growing season (usually spring and sometimes fall) following the completion of construction activities, with particular attention given to any infestation occurring in previously unaffected areas;
- Identifying and assessing locations where additional remedial action or treatment may be required, and recommending treatment actions; and
- Recording any additional weed control treatments carried out in the reporting period.

In conjunction with the Project Proponent's reclamation monitoring, weed monitoring would include:

- Monitoring and assessment of the reseeding effort during the second growing season, with subsequent follow-up surveys in the third and fifth growing seasons post-restoration (note that reseeding efforts would occur in agreement with relevant agencies in any area where monitoring during the second growing season determines a re-vegetation failure); and
- Assessment of Project stability, re-vegetation progress, and percentage of vegetative cover (qualitative analysis and success criteria should be specified in the Project Proponent's Reclamation Plan).
- The Project Proponent will document the above observations for presentation in monitoring reports to be made available to the BLM, FWS, and respective local weed management boards, as required.

4.3 Monitoring of Known Infestation Areas

In addition to biannual and ongoing weed monitoring (noted previously) the Project Proponent will conduct annual site visits to monitor known infestation areas. These areas will be assessed and then treated as described in the treatment methods if needed. The Project Proponent will continue to visit these known infestation areas until weed control measures show significant improvement or eradication of weeds for these areas.

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Appendix A

Table 1
State Listed Noxious Weeds of Nevada
Searchlight Wind Farm
Clark County, Nevada

NAC 555.010 Designation and categorization of noxious weeds. (NRS 555.130**)**

Category A Weeds[1]:	
(1) African rue.	(Peganum harmala)
(2) Austrian fieldcress.	(Rorippa austriaca)
(3) Austrian peaweed.	(Sphaerophysa salsula)
(4) Black henbane.	(Hysocyamus niger)
(5) Camelthorn.	(Alhagi pseudalhagi)
(6) Common crupina.	(Crupina vulgaris)
(7) Dalmatian toadflax.	(Linaria dalmatica)
(8) Dyer's woad.	(Isatis tinctoria)
(9) Eurasian water-milfoil.	(Myriophyllum spicatum)
(10) Giant reed.	(Arundo donax)
(11) Giant salvinia.	(Salvinia molesta)
(12) Goats rue.	(Galega officinalis)
(13) Green fountain grass.	(Pennisetum setaceum)
(14) Houndstongue.	(Cynoglossum officinale)
(15) Hydrilla.	(Hydrilla verticillata)
(16) Iberian starthistle.	(Centaurea iberica)
(17) Klamath weed.	(Hypericum perforatum)
(18) Malta starthistle.	(Centaurea melitensis)
(19) Mayweed chamomile.	(Anthemis cotula)
(20) Mediterranean sage.	(Salvia aethiopis)

Table 1
State Listed Noxious Weeds of Nevada
Searchlight Wind Farm
Clark County, Nevada

(21) Purple loosestrife.	(Lythrum salicaria, Lythrum virgatum and their cultivars)
(22) Purple starthistle.	(Centaurea calcitrapa)
(23) Rush skeletonweed.	(Chondrilla juncea)
(24) Sow thistle.	(Sonchus arvensis)
(25) Spotted knapweed.	(Centaurea maculosa)
(26) Squarrose knapweed.	(Centaurea virgata)
(27) Sulfur cinquefoil.	(Potentilla recta)
(28) Syrian bean caper.	(Zygophyllum fabago)
(29) Yellow starthistle.	(Centaurea solstitialis)
(30) Yellow toadflax.	(Linaria vulgaris)
Category B Weeds[2]:	
(1) Carolina horse nettle.	(Solanum carolinense)
(2) Diffuse knapweed.	(Centaurea diffusa)
(3) Leafy spurge.	(Euphorbia esula)
(4) Medusahead.	(Taeniatherum caput-medusae)
(5) Musk thistle.	(Carduus nutans)
(6) Russian knapweed.	(Acroptilon repens)
(7) Sahara mustard.	(Brassica tournefortii)
(8) Scotch thistle.	(Onopordum acanthium)
(9) White horse nettle.	(Solanum elaeagnifolium)
Category C Weeds[3]:	
(1) Canada thistle.	(Cirsium arvense)

(2) Hoary cress.	(Cardaria draba)
(3) Johnson grass.	(Sorghum halepense)
(4) Perennial pepperweed.	(Lepidium latifolium)
(5) Poison Hemlock.	(Conium maculatum)
(6) Puncture vine.	(Tribulus terrestris)
(7) Salt cedar (tamarisk).	(Tamarix spp.)
(8) Water Hemlock.	(Cicuta maculata)

[1]Category "A"

- Weeds not found or limited in distribution throughout the state
- Actively excluded from the state and actively eradicated wherever found
- Actively eradicated from nursery premises
- Control required by the state in all infestations

[2]Category "B"

- Weeds established in scattered populations in some counties of the state
- Actively excluded where possible
- Actively eradicated from nursery premises
- Control required by the state in areas where populations are not well-established or previously unknown to occur

[3]Category "C"

- Weeds currently established and generally widespread in many counties of the state
- Actively eradicated from nursery premises
- Abatement at the discretion of the State Quarantine Officer

[Dep't of Agriculture, No. 55.11, eff. 5-25-62; A 5-1-68]—(NAC A by St. Quarantine Officer, 8-9-94; R191-99, 8-7-2000; R097-01, 5-1-2002; R003-03, 9-24-2003; R109-04, 10-5-2004; R028-05, 10-31-2005; R020-06, 6-28-2006; R156-08, 2-11-2009)

Table 2
Observed Flora
Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
APIACEAE - Carrot Family					
Apiaceae	*Cymopterus multinervatus*	Purplenerve Springparsley	Sandy and rocky slopes	per	
APOCYNACEAE - Milkweed Family					
Apocynaceae	*Amsonia tomentosa*	woolly bluestar/amsonia	desert plains, canyons	subshrub	
ASCLEPIADACEAE - Milkweed Family					
Asclepiadaceae	*Asclepias nyctaginifolia*	Mojave milkweed	arroyos, dry slopes	per	Apocynaceae
Asclepiadaceae	*Asclepias subulata*	rush milkweed, ajamete	arroyos, washes	ann	Apocynaceae
ASTERACEAE - Sunflower Family					
Asteraceae	*Acamptopappus sphaerocephalus var. sphaerocephalus*	rayless goldenhead	gravelly/rocky slopes, flats, desert to juniper woodland	shrub	
Asteraceae	*Adenophyllum cooperi*	Cooper's dogweed/dyssodia	dry sandy slopes and washes	subshrb	
Asteraceae	*Adenophyllum porophylloides*	San Felipe dogweed/dyssodia	dry rocky hillsides, washes	subshrb	
Asteraceae	*Ambrosia dumosa*	burro-weed	creosote bush scrub	shrub	
Asteraceae	*Ambrosia eriocentra*	woolly bur-sage	dry washes and slopes	shrub	
Asteraceae	*Baccharis sergiloides*	desert baccharis	gravelly or sandy stream beds	shrub	
Asteraceae	*Baileya multiradiata*	desert marigold	desert roadsides, flats washes hillsides	ann/per	
Asteraceae	*Bebbia juncea var. aspera*	sweetbush	dry rocky slopes, desert plains, washes	shrub	
Asteraceae	*Brickellia atrctyloides var. arguta*	pungent brickellbush, spearleaf brickellia	rocky places	shrub	
Asteraceae	*Brickellia incana*	woolly brickellbush	sandy washes, flats	shrub	*Brickellia atrctyloides var. arguta*

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FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
Asteraceae	*Calycoseris parryi*	yellow tackstem	sandy to gravelly slopes, washes	ann	
Asteraceae	*Chaenactis carphoclinia var. carphoclinia*	pebble pincushion	open rocks or gravel	ann	
Asteraceae	*Chaenactis fremontii*	Fremont pincushion	open sand or gravel	ann	
Asteraceae	*Chaenactis macrantha*	Mojave pincushion	open (often calcareous) san or gravel	ann	
Asteraceae	*Chaenactis stevioides*	desert pincushion	open flats, slopes	ann	
Asteraceae	*Chrysothamnus paniculatus*	black-stem	gravelly washes	shrub	*Ericameria paniculata*
Asteraceae	*Encelia farinosa*	brittlebush, incienso	slopes, washes, flats	shrub	
Asteraceae	*Encelia frutescens*	button brittlebush	desert washes, flats, slopes, roadsides	shrub	
Asteraceae	*Encelia virginensis*	Virgin River brittlebush	desert flats, rocky slopes, roadsides	shrub	
Asteraceae	*Ericameria cooperi*	Cooper's goldenbush	rocky slopes/valleys, creosote-bush scrub, Joshua-tree wdland	shrub	
Asteraceae	*Ericameria laricifolia*	turpentine bush	rocky canyons, creosote bush scrub, pinyon/juniper woodlnd	shrub	
Asteraceae	*Ericameria paniculata*	black-stem	gravelly washes	shrub	
Asteraceae	*Erigeron concinnus var. concinnus*	Navajo fleabane, shaggy daisy	sandy to rocky slopes, crevices	per	
Asteraceae	*Eriophyllum wallacei*	wooly Easterbonnets	chaparral, sagebrush, desert scrub or woodland	ann	
Asteraceae	*Gutierrezia sarothrae*	broom snakeweed	grasslands, deserts, montane areas	subshrub	
Asteraceae	*Hymenoclea salsola*	cheesebush	dry flats, washes, fans	subshrub	*Ambrosia salsola*
Asteraceae	*Malacothrix coulteri*	snake's head	sandy open areas,coastal sage, grassland, deserts	ann	
Asteraceae	*Malacothrix glabrata*	desert dandelion	coarse soils in open areas or amoung shrubs	ann	

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Asteraceae	*Monoptilon bellidiforme*	daisy desertstar	sandy deserts, washes	ann	
Asteraceae	*Monoptilon bellioides*	Mojave desertstar	sandy deserts, washes	ann	
Asteraceae	*Perityle emoryi*	Emory rock-daisy	desert plains, slopes, washes	ann	
Asteraceae	*Peucephyllum schottii*	pygmy cedar	rocky slopes, often amoung boulders	shrub	
Asteraceae	*Porophyllum gracile*	odora	rocky slopes	subshrub	
Asteraceae	*Prenanthella exigua*	prenanthella	desert canyons & valleys, juniper woodland	ann	
Asteraceae	*Psilostrophe cooperi*	whitestem paperflower	dry plains, hillsides, washes	subshrub	
Asteraceae	*Rafinesquia neomexicana*	desert chicory	sandy or gravelly desert soils	ann	
Asteraceae	*Stephanomeria exigua*	wire lettuce	desert scrub, dry disturbed ground	ann/shrub	
Asteraceae	*Stephanomeria pauciflora*	wire lettuce	dry flats, deserts	per/subshrb	
Asteraceae	*Stylocline micropoides*	desert nest straw	stable rocky or sandy often calcareous soils	ann	
Asteraceae	*Tetradymia stenolepis*	Mojave cottonthorn/horsebrush	Joshua-tree woodland, creosote-bush scrub	shrub	
Asteraceae	*Trichoptilium incisum*	yellowdome	dry slopes, plains	ann/per	
Asteraceae	*Uropappus lindleyi*	Lindley's silverpuffs	rocky soils chaparral or grassy slopes	ann	
Asteraceae	*Viguiera parishii*	Parish's goldeneye	washes, dry, rocky slopes	shrub	*Bahiopsis parishii*
Asteraceae	*Xylorhiza tortifolia var. tortifolia*	Mojave aster	desert slopes, canyons	per/subshrb	

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BORAGINACEAE - Borage Family					
Boraginaceae	*Amsinckia menziesii var. intermedia*	common fiddleneck	open disturbed areas	ann	
Boraginaceae	*Amsinckia tessellata var. tessellata*	bristly fiddleneck	sandy or gravelly areas, inland	ann	
Boraginaceae	*Cryptantha barbigera*		open, sandy to rocky soils	ann	
Boraginaceae	*Cryptantha circumscissa*	cushion cryptantha/catseye	sandy soils	ann	
Boraginaceae	*Cryptantha micrantha*	redroot cryptantha/catseye	sandy soils	ann	
Boraginaceae	*Cryptantha nevadensis*	Nevada cryptantha/catseye	sandy to gravelly soils	ann	
Boraginaceae	*Cryptantha petrocarya*	wingnut cryptantha	sandy to gravelly soils	ann	
Boraginaceae	*Pectocarya heterocarpa*		washes, roadsides, openings in creosote-bush shrub	ann	
Boraginaceae	*Pectocarya platycarpa*	broadfruit combseed	washes, roadsds creosote-bush scrub, joshua-tree woodlnd	ann	
Boraginaceae	*Pectocarya recurvata*	curvenut combseed	creosote-bush scrub, Joshua-tree woodland	ann	
Boraginaceae	*Plagiobothrys arizonicus*	Arizona popcornflower, blood weed	dry coarse soils in scrub or woodland	ann	
BRASSICACEAE - Mustard Family					
Brassicaceae	*Arabis pulchra var. gracilis*	beautiful/prince's rockcress	canyons, slopes, washes, limestone soils	per	
Brassicaceae	*Brassica tournefortii**	Asian/African mustard	roadsides, washes, open areas	ann	
Brassicaceae	*Caulanthus cooperi*	Cooper's wild cabbage/jewelflower	sandy or gravelly soils amonug shrubs	ann	
Brassicaceae	*Descurainia pinnata*	western/pinnate tansymustard	washes, slopes, often saline soils	ann	
Brassicaceae	*Draba cuneifolia*	wedgeleaf draba	open or disturbed areas	ann	
Brassicaceae	*Guillenia lasiophylla*	California mustard	dry open slopes, serpentine, burns	ann	

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Brassicaceae	*Lepidium fremontii*	desert allysum/pepperweed	sandy washes, gravelly soils, rocky slopes & ridges	per	
Brassicaceae	*Lepidium lasiocarpum var lasiocarpum*	hairypod pepperweed	dry flats, washes, roadsides, sagebrush	ann	*Lepidium lasiocarpum ssp. lasiocarpum*
Brassicaceae	*Lesquerella tenella*	moapa bladderpod	sandy soils, washes slopes	ann	*Physaria tenella*
Brassicaceae	*Sisymbrium irio**	London rocket	disturbed areas, roadsides, orchards	ann	
Brassicaceae	*Sisymbrium orientale**	oriental mustard	disturbed areas	ann	
Brassicaceae	*Thysanocarpus curvipes*	lacepod/fringe pod, ribbed fringepod	grassy or brushy slopes, moist meadows	ann	
Brassicaceae	*Thysanocarpus laciniatus*	crenate/ narrow-leaved fringe pod	dry rocky slopes and ridges	ann	
CACTACEAE - Cactus Family					
Cactaceae	*Echinocactus polycephalus var. polycephalus*	cottontop,clustered barrel cactus	rocky hills, silty valleys		
Cactaceae	*Echinocereus engelmannii*	hedgehog cactus, Engelmann's hedgehog	dry habitats	shrub	
Cactaceae	*Ferocactus cylindraceus*	California barrel cactus	gravelly, rocky or sandy areas		
Cactaceae	*Mammillaria tetrancistra*	common fishhook cactus	creosote-bush scrub	per	
Cactaceae	*Cylindropuntia acanthocarpa var. coloradensis*	buckhorn cholla	creosote-bush scrub, joshua-tree woodland	shrub	*Cylindropuntia acanthocarpa var.*
Cactaceae	*Opuntia basilaris var. basilaris*	beavertail cactus/pricklypear	desert, chaparral, pinyon-juniper woodland	shrub	
Cactaceae	*Cylindropuntia bigelovii*	teddy-bear cholla	creosote-bush scrub	shrub	*Cylindropuntia bigelovii*
Cactaceae	*Cylindropuntia echinocarpa*	silver/golden cholla	dry habitats	shrub	*Cylindropuntia echinocarpa*
Cactaceae	*Opuntia erinacea*	old man cactus, hairy prickly-pear	creosote-bush shrub to pine srub	shrub	*Opuntia polyacantha var.*
Cactaceae	*Opuntia parishii*	club/ mat cholla	sandy flats	shrub	*Grusonia parishii*
Cactaceae	*Cylindropuntia ramosissima*	pencil cactus, diamond cholla	desert flats	shrub	*Cylindropuntia ramosissima*
Cactaceae	*Sclerocactus johnsonii*	Johnson pineapple cactus, pygmy barrel cactus	granitic areas, creosote-bush scrub		*Echinomastus johnsonii*

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CAMPANULACEAE - Bellflower Family					
Campanulaceae	*Nemacladus glanduliferus var. orientalis*	glandular threadplant	rocky slopes, sandy soils, washes	ann	*Nemacladus orientalis*
Campanulaceae	*Nemacladus rubescens*		dry, sandy or gravelly soils	ann	
CARYOPHYLLACEAE - Pink Family					
Caryophyllaceae	*Arenaria macradenia v macradenia*	desert sandwort	dry rocky slopes, alluvial deposits, often on carbonates	per	*Eremogone macrodenia var. macrodenia*
CHENOPODIACEAE - Goosefoot Family					
Chenopodiaceae	*Grayia spinosa*	spiny hop-sage	sandy to gravelly soils, shrubland, pinyon/juniper woodlnd	shrub	
Chenopodiaceae	*Krascheninnikovia lanata*	winter fat	rocky to clay soils, flats to gentle slopes	shrub	
Chenopodiaceae	*Salsola tragus**	Russian thistle, tumbleweed	disturbed areas	ann	
CUCURBITACEAE - Gourd Family					
Cucurbitaceae	*Cucurbita palmata*	coyote melon/gourd	sandy areas	vine	
CUSCUTACEAE - Dodder Family					
Cuscutaceae	*Cuscuta denticulata*	desert dodder	on herbs or shrubs, creosote bush scrub, joshua-tree wdlnd	ann	
EPHEDRACEAE - Ephedra Family					
Ephedraceae	*Ephedra nevadensis*	Nevada ephedra/Morman tea	creosote-bush scrub, Joshua-tree woodland	shrub	
Ephedraceae	*Ephedra viridis*	green ephedra	sagebrush, creosote-bush scrub, joshua tree woodland	shrub	

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EUPHORBIACEAE - Spurge Family					
Euphorbiaceae	*Chamaesyce albomarginata*	rattlesnake weed	dry slopes	per	
Euphorbiaceae	*Chamaesyce micromera*		sandy places	ann/per	
Euphorbiaceae	*Chamaesyce polycarpa*	smallseed sandmat	dry sandy slopes & flats	per	
Euphorbiaceae	*Ditaxis neomexicana*	common ditaxis	creosote-bush scrub	ann/per	
FABACEAE - Legume Family					
Fabaceae	*Acacia greggii*	catclaw	flats, washes	shrub/tree	*Senegalia greggii*
Fabaceae	*Astragalus acutirostris*		sandy or gravelly areas	ann	
Fabaceae	*Astragalus didymocarpus var. dispermus*	two-seeded/dwarf white milkvetch	sandy or gravelly areas	ann	
Fabaceae	*Astragalus layneae*	widow's milkvetch	sandy flats, washes	per	
Fabaceae	*Astragalus lentiginosus var. fremontii*	Fremont's milkvetch	open sand, gravel	ann/per	
Fabaceae	*Astragalus nuttallianus var. imperfectus*	turkey peas	sandy or gravelly flats or washes	ann	
Fabaceae	*Dalea mollis*	hairy prairieclover	creosote bush flats, washes, roadsides	ann	
Fabaceae	*Lotus humistratus*	hill lotus, foothill deervetch, maresfat	dry gravely or sandy slopes & ridges	ann	
Fabaceae	*Lotus strigosus*	strigose trefoil, bishop lotus	dry sandy or gravelly slopes or flats	ann	
Fabaceae	*Lupinus concinnus*	bajada lupine	open or disturbed areas, burns	ann	
Fabaceae	*Lupinus sparsiflorus*	Coulter's lupine	washes, sandy areas	ann	
Fabaceae	*Psorothamnus fremontii var. fremontii*	Fremont's indigo-bush/false dalea	granite and volcanic slopes, flats, canyons	shrub	

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GERANIACEAE - Geranium Family					
Geraniaceae	*Erodium cicutarium**	red-stemmed filaree	disturbed grassy slopes, pastures	ann	
Geraniaceae	*Erodium texanum*	Texas storksbill	dry open sites, shrubland	ann/bien	
HYDROPHYLLACEAE - Waterleaf Family					
Hydrophyllaceae	*Eucrypta chrysanthemifolia var. bipinnatifida*	spotted hideseed	cliffs, rocky slopes, crevices, washes	ann	Boraginaceae
Hydrophyllaceae	*Eucrypta micrantha*	desert hideseed/eucrypta	rocky crevices, washes, slopes	ann	Boraginaceae
Hydrophyllaceae	*Nama demissum var. demissum*	desert purple mat	sandy or gravelly flats	ann	Boraginaceae
Hydrophyllaceae	*Phacelia crenulata var.*	caterpillarweed, purple stem phacelia	sandy to gravelly washes, slopes	ann	Boraginaceae
Hydrophyllaceae	*Phacelia cryptantha*	hiddenflower/limestone phacelia	gravelly or rocky slopes, canyons	ann	Boraginaceae
Hydrophyllaceae	*Phacelia distans*	distant/common phacelia	clay or rocky soils, slopes	ann	Boraginaceae
Hydrophyllaceae	*Phacelia fremontii*	Fremont's phacelia	sandy or gravelly soils, shrubland, grassland	ann	Boraginaceae
Hydrophyllaceae	*Phacelia perityloides*	Rock phacelia	crevices on cliffs, rocky, often calcareous slopes	ann/per	Boraginaceae
Hydrophyllaceae	*Phacelia rotundifolia*	roundleaf phacelia	rocky slopes, cervices, ledges creosote scrub, pinyon/Juniper	ann	Boraginaceae

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KRAMERIACEAE - Rhatany Family					
Krameriaceae	*Krameria erecta*	pima rhatany, purple heather	dry rocky ridges, slopes	shrub	
Krameriaceae	*Krameria grayi*	white rhatany	dry rocky or sandy areas, esp. lime soils	shrub	
LAMIACEAE - Mint Family					
Lamiaceae	*Hyptis emoryi*	desert Lavender	gravelly, sandy washes, canyons, desert shrubland	shrub	
Lamiaceae	*Salazaria mexicana*	Mexican bladder sage	sandy to gravelly slopes, washes, shrubland, woodland	shrub	
Lamiaceae	*Salvia columbariae*	chia	dry disturbed areas	ann	
Lamiaceae	*Salvia dorii var. piilosa*	hairy/purple sage	desert slopes, washes	shrub	
LILIACEAE - Lily Family					
Liliaceae	*Calochortus kennedyi var. kennedyi*	desert mariposa	heavy or rocky soils, creosote-bush scrub, pinyon/juniper	per	
Liliaceae	*Dichelostemma capitatum ssp. capitatum*	blue dicks	grassy slopes	per corm	
Liliaceae	*Yucca baccata*	banana yucca	dry joshua tree woodland	shrub	
Liliaceae	*Yucca brevifolia*	Joshua tree	desert flats & slopes	tree	
Liliaceae	*Yucca schidigera*	Mojave yucca	chaparral, creosote-bush scrub	shrub	

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LOASACEAE - Loasa Family					
Loasaceae	*Eucnide urens*	desert rock nettle/stingbush	cliffs, rocky slopes, washes	subshrb	
Loasaceae	*Mentzelia albicaulis*	whitestem blazingstar	shrubland to pinyon/juniper, gravel fans, washes	ann	
Loasaceae	*Mentzelia tricuspis*	spinyhair stickleaf, desert blazingstar	sandy or gravelly slopes in creosote-bush scrub	ann	
Loasaceae	*Mentzelia veatchiana*	Veatch's blazingstar, whitestem stickleaf	sandy grassland, shrubland, oak/pine woodland	ann	
MALVACEAE - Mallow Family					
Malvaceae	*Eremalche rotundifolia*	desert five-spot	dry desert scrub	ann	
Malvaceae	*Sphaeralcea ambigua*	desert globemallow, apricot mallow	desert scrub	ann	
NYCTAGINACEAE - Four O'Clock Family					
Nyctaginaceae	*Allionia incarnata*	trailing four-o-clock, windmills	creosote bush scrub	ann/per	
Nyctaginaceae	*Mirabilis bigelovii var. bigelovii*	Bigelow's four o'clock, desert wishbone bush	rocky places	per/subshrb	
Nyctaginaceae	*Mirabilis multiflora*	desert four o'clock	dry rocky or sandy areas	per	
OLEACEAE - Olive Family					
Oleaceae	*Menodora scoparia*	desert olive, broom twinberry	rocky slopes, canyons	per/shrub	
Oleaceae	*Menodora spinescens*	spiny menodora/desert olive	rocky slopes, canyons	shrub	
ONAGRACEAE - Evening primrose Family					
Onagraceae	*Camissonia boothii ssp.*			ann	
Onagraceae	*Camissonia brevipes ssp.*	golden suncup	sandy slopes, washes, alluvial fans	ann	
Onagraceae	*Camissonia chamaenerioides*	longcapsule/willow herb suncup	sandy slopes, flats, desert scrub	ann	
Onagraceae	*Camissonia claviformis ssp. claviformis*	browneyes	alluvial slopes, flats, ceosote-bush scrub	ann	
Onagraceae	*Camissonia refracta*	narrowleaf suncup	sandy slopes, flats, desert scrub	ann	

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OROBANCHACEAE - Broom-Rape Family					
Orobanchaceae	*Orobanche cooperi*	Broom-Rape	sandy flats, washes, on Asteraceae	ann/per	
PAPAVERACEAE - Poppy Family					
Papaveraceae	*Eschscholzia glyptosperma*	desert golden poppy	desert washes, flats, slopes	ann	
Papaveraceae	*Eschscholzia minutiflora*	pygmy golden poppy	desert washes, flats, slopes	ann	
PLANTAGINACEAE - Plantain Family					
Plantaginaceae	*Plantago ovata*	desert indianwheat	gravelly soils, desert, sagebrush, coastal strand	ann	
POACEAE - Grass Family					
Poaceae	*Achnatherum hymenoides*	indian ricegrass	dry well drained soils, desert shrubland, pinyon/juniper	per	
Poaceae	*Achnatherum speciosum*	desert needlegras	rocky slopes, canyons, washes	per	
Poaceae	*Aristida purpurea var. nealleyi*	Nealley three-awn	dry slopes, plains, shrubland	per	
Poaceae	*Cynodon dactylon**	bermuda grass	waste places	per	
Poaceae	*Bromus madritensis ssp. rubens**	foxtail chess, red brome	disturbed areas	ann	
Poaceae	*Erioneuron pulchellum*	fluff grass	sandy to rocky desert shrubland, woodland	per	
Poaceae	*Muhlenbergia porteri*	bush muhly	amoung boulders or shrubs, rocky slopes, cliffs	per	
Poaceae	*Pleuraphis rigida*	big galleta	dry open flats, washes, sandunes, scrub, woodland	per	
Poaceae	*Triden muticus*	slim tridens	dry, rocky, gen limestone soils, creosote-bush shrubland, pinyon/juniper woodland	per	
Poaceae	*Schismus barbatus**	old han schismus	dry, open, generally disturbed areas	ann	

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POLEMONIACEAE - Phlox Family					
Polemoniaceae	*Eriastrum eremicum ssp. eremicum*	desert woollystar/eriastrum	open areas in sandy soils	ann	
Polemoniaceae	*Gilia brecciarum ssp. brecciarum*	Nevada gilia	sandy flats in open shrubland, woodland	ann	
Polemoniaceae	*Gilia scopulorum*		semi-shaded rocky ravines	ann	
Polemoniaceae	*Langloisia setosissima ssp. setosissima*	Great Basin/bristly langloisia	desert washes, flats, slopes gravelly to sandy soil	ann	
Polemoniaceae	*Leptosiphon aureus ssp. aureus*	golden desert trumpets	desert flats	ann	*Leptosiphon aureus ssp. aureus*
Polemoniaceae	*Leptosiphon aureus ssp. decorus*	white desert trumpets	desert flats	ann	*Leptosiphon aureus ssp. decorus*
Polemoniaceae	*Linanthus demissus*	desertsnow, desert linanthus	limestone soils, desert pavement, sandy areas	ann	
Polemoniaceae	*Linanthus dichotomus*	evening snow	drying open areas, esp serpentine	ann	
Polemoniaceae	*Loeseliastrum schottii*	Schott's calico	desert washes, flats, slopes, sandy to gravelly	ann	
POLYGONACEAE - Buckwheat Family					
Polygonaceae	*Chorizanthe brevicornu*	brittle spineflower	desert scrub, sagebrush, juniper woodland	ann	
Polygonaceae	*Chorizanthe rigida*	spiny-herb, devil's spineflower, spiny chorizanthe	desert scrub, pavement	ann	
Polygonaceae	*Eriogonum angulosum*	anglestem buckwheat	dry open places, sand or clay	ann	
Polygonaceae	*Eriogonum deflexum var. deflexum*	flat-topped/flatcrown buckwheat	sand	ann	

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Polygonaceae	*Eriogonum deflexum var. rectum*	flat-topped buckwheat	sand	ann/shrub	
Polygonaceae	*Eriogonum fasciculatum var. polifolium*	California buckwheat		shrub	
Polygonaceae	*Eriogonum gracillimum*	rose & white buckwheat	clay to gravel	ann	
Polygonaceae	*Eriogonum inflatum*	desert trumpet	dry sand or gravel	ann/per	
Polygonaceae	*Eriogonum maculatum*	spotted buckwheat	gravel to clay soils	ann	
Polygonaceae	*Eriogonum nidularium*	birdnest buckwheat	sand or gravel flats, washes	ann	
Polygonaceae	*Eriogonum palmerianum*	Palmer's buckwheat	sand or gravel	ann	
Polygonaceae	*Eriogonum plumatella*	yucca/flattop buckwheat	dry sloopes & washes	shrub	
Polygonaceae	*Eriogonum pusillum*	yellow-turbans	sand or gravel	ann	
Polygonaceae	*Eriogonum thomasii*	Thomas buckwheat	sand or gravel	ann	
Polygonaceae	*Oxytheca perfoliata*	roundleaf puncturebract	sandy to rocky creosote-bush or pinyon scrub	ann	
RANUNCULACEAE - Buttercup Family					
Ranunculaceae	*Delphinium parishii ssp. parishii*	Parish's/desert larkspur	desert scrub, juniper woodland	per	
ROSACEAE - Rose Family					
Rosaceae	*Coleogyne ramosissima*	blackbush	dry open slopes, creosote bush scrub, pinyon/ juniper	shrub	
Rosaceae	*Prunus fasciculata var. fasciculata*	desert almond	slopes canyons, washes. Shrubland, woodland	shrub	

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RUBIACEAE - Madder Family					
Rubiaceae	*Galium stellatum var. eremicum*	Munz's/starry bedstraw	rocky slopes	shrub	
SCROPHULARIACEAE - Figwort Family					
Scrophulariaceae	*Antirrhinum filipes*	twining snapdragon	on shrubs & debris, gen in washes	ann	Plantaginaceae
Scrophulariaceae	*Mimulus bigelovii*	monkey flower	rocky desert slopes, margins of washes	ann/shrub	
SOLANACEAE - Nightshade Family					
Solanaceae	*Datura sp.*	Jimson weed		ann-per	
Solanaceae	*Lycium andersonii*	Anderson's wolfberry	gravelly or rocky slopes, washes	shrub	
Solanaceae	*Lycium cooperi*	Cooper's box thorn/wolfberry/peach thorn	sandy to rocky flats, washes	shrub	
Solanaceae	*Nicotiana obtusifolia*	desert tobacco	gravelly or rocky washes, slopes	ann/small tree	
Solanaceae	*Physalis crassifolia*	yellow nightshade groundcherry	gravelly to rocky flats, washes, slopes	per/subshrb	
VISCACEAE - Mistletoe Family					
Viscaceae	*Phoradendron californicum*	desert mistletoe	deserts on Acacia, Cercidium, Larrea(rare), Olneya, Prosopis	shrub	
ZYGOPHYLLACEAE - Caltrop Family					
Zygophyllaceae	*Larrea tridentata*	creosote bush	desert scrub	shrub	

* indicates species considered to be a weed (non-native, introduced, or naturalized)

Table 3
Construction and Post-construction Weed Monitoring Timeline*
Searchlight Wind Farm
Clark County, Nevada

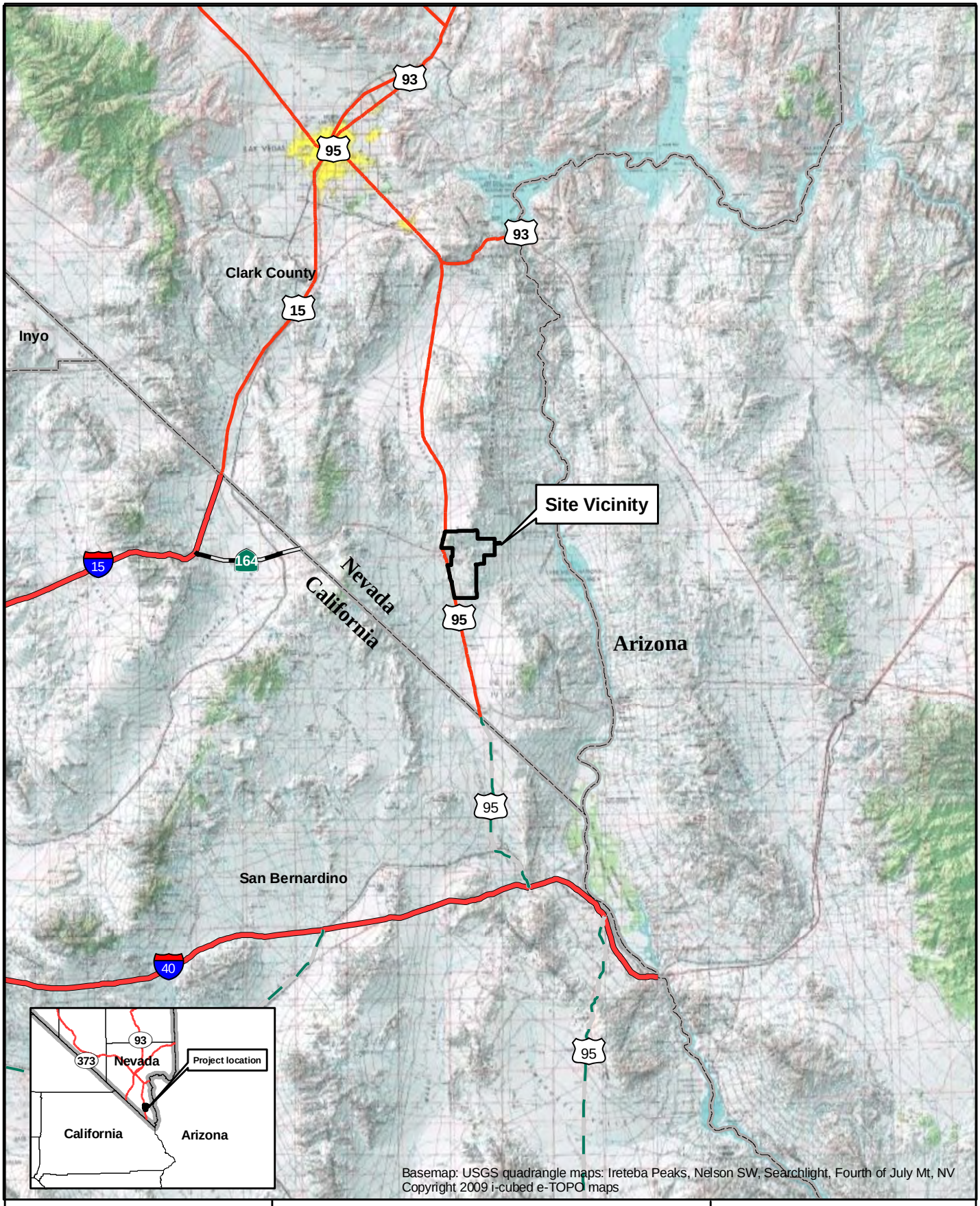
Monitoring Effort	**Construction[1]**	**Post-construction[1]**					**Comments**
		Year 1	Year 2	Year 3	Year 5	Continues bi-annually for life of project	
Known infestations	x	x	x	x	x	x	Annual site visits to monitor known infestations until weed control measures show significant improvement or control of weeds
Reclaimed areas (includes monitoring of re-seeding effort)	Re-seed	Primary and secondary growing season		x	x	x	Monitoring effort includes Identifying and assessing weed conditions
Identify new areas for treatment or control[2]	x	x		x	x	x	
Re-vegetation assessment		x		x		x	

*Monitoring times and conditions may change as needed and may vary from year-to-year.

1. All monitor times will occur in winter before fruiting occurs should treatment need to be applied, unless noted otherwise

2. In the event of any new infestation, the monitoring schedule may become more frequent

Appendix B



Legend

Project Boundary

Searchlight Wind Farm

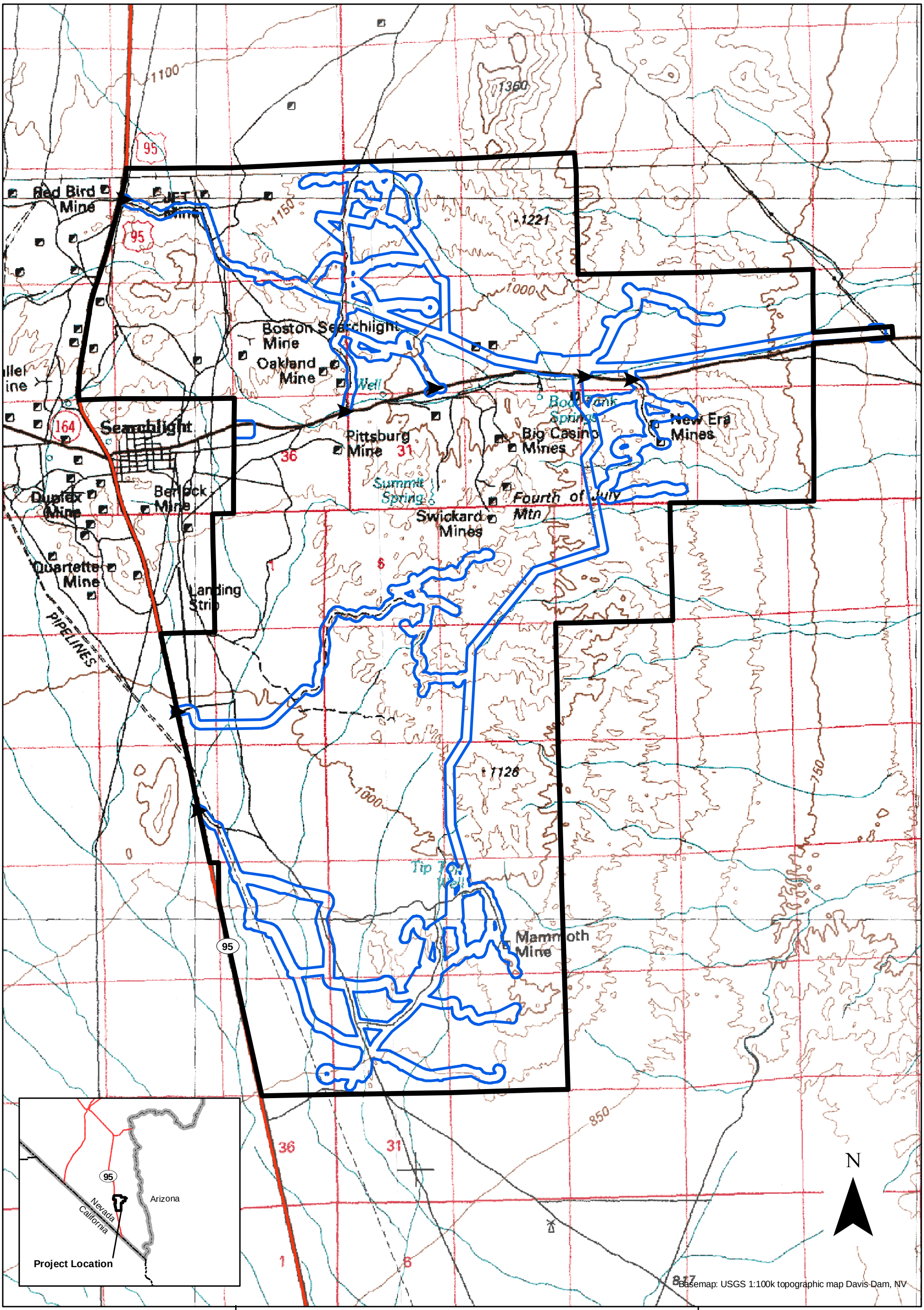
0 10 20 30 Miles

Project Number: 09-1034

Date: 11/17/2010

Plate 1
Site Location

Alphabiota



Legend

- Access Points
- Survey Corridor (200 ft from centerline)
- Project Boundary

Searchlight Wind Farm

0 0.5 1 2 Miles

Scale 1:50,000

Project Number: 09-1034

Date: 11/17/2010

Plate 2
Project Boundary

Alphabiota

Brassica tournefortii

Brassica tournefortii

N

Basemap: Bing Web Mapping Service ©Microsoft Corporation 2009

Legend

Brassica tournefortii
(species observed in these areas)

Survey Corridor
(200 ft. from centerline)

Searchlight Wind Farm

0 1,000 2,000 3,000 Feet

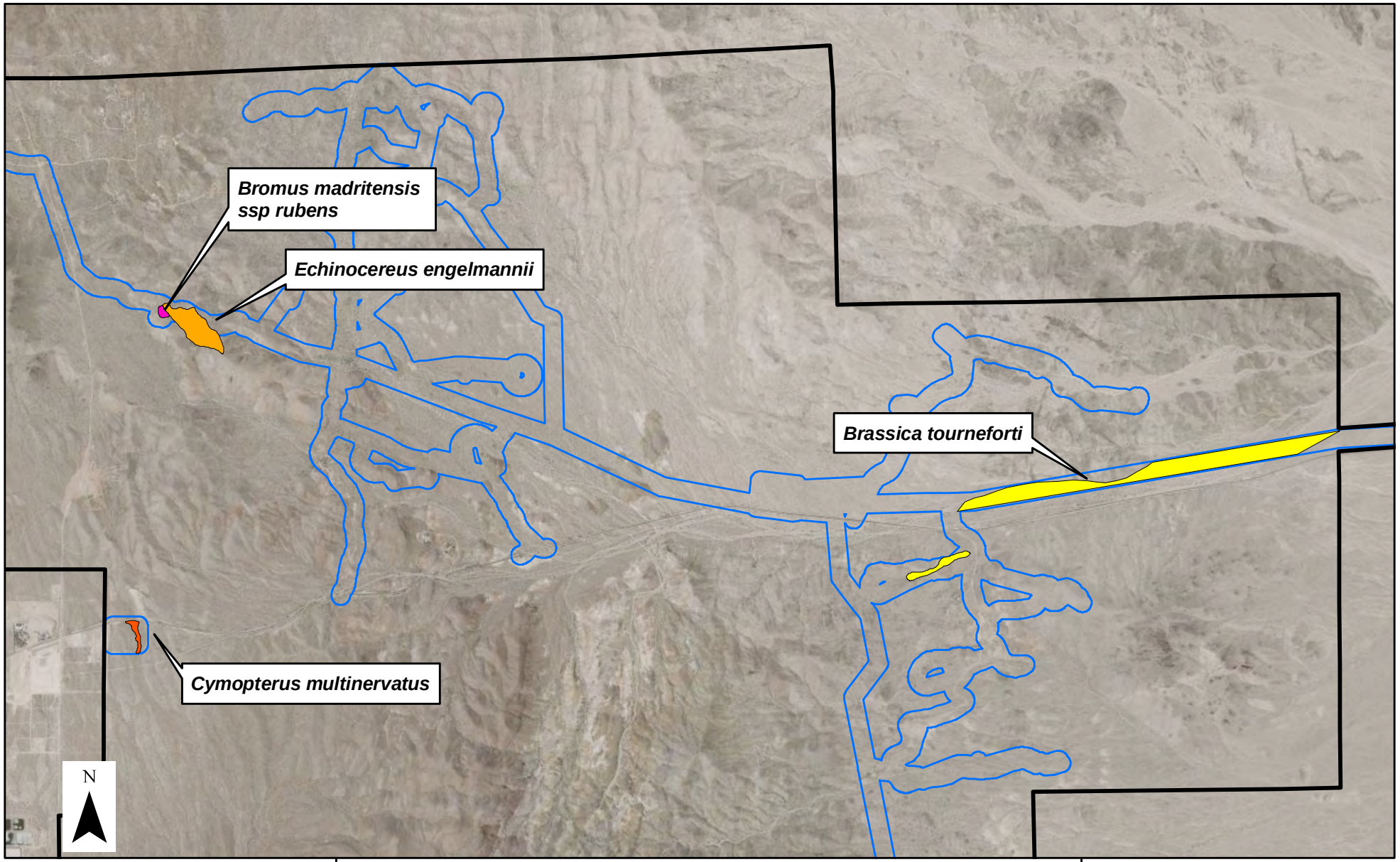
Scale 1:10,000

Project Number: 09-1034

Date: 11/17/2010

Plate 3
Brassica tournefortii

Alphabiota
ENVIRONMENTAL CONSULTING



Legend

Plant location

Species observed in these areas

- Brassica tourneforti
- Cymopterus multinervatus
- Echinocereus engelmannii
- Bromus madritensis ssp rubens
- Project Boundary
- Survey Corridor (200 ft from centerline)

Searchlight Wind Farm

0 0.5 1 2 Miles

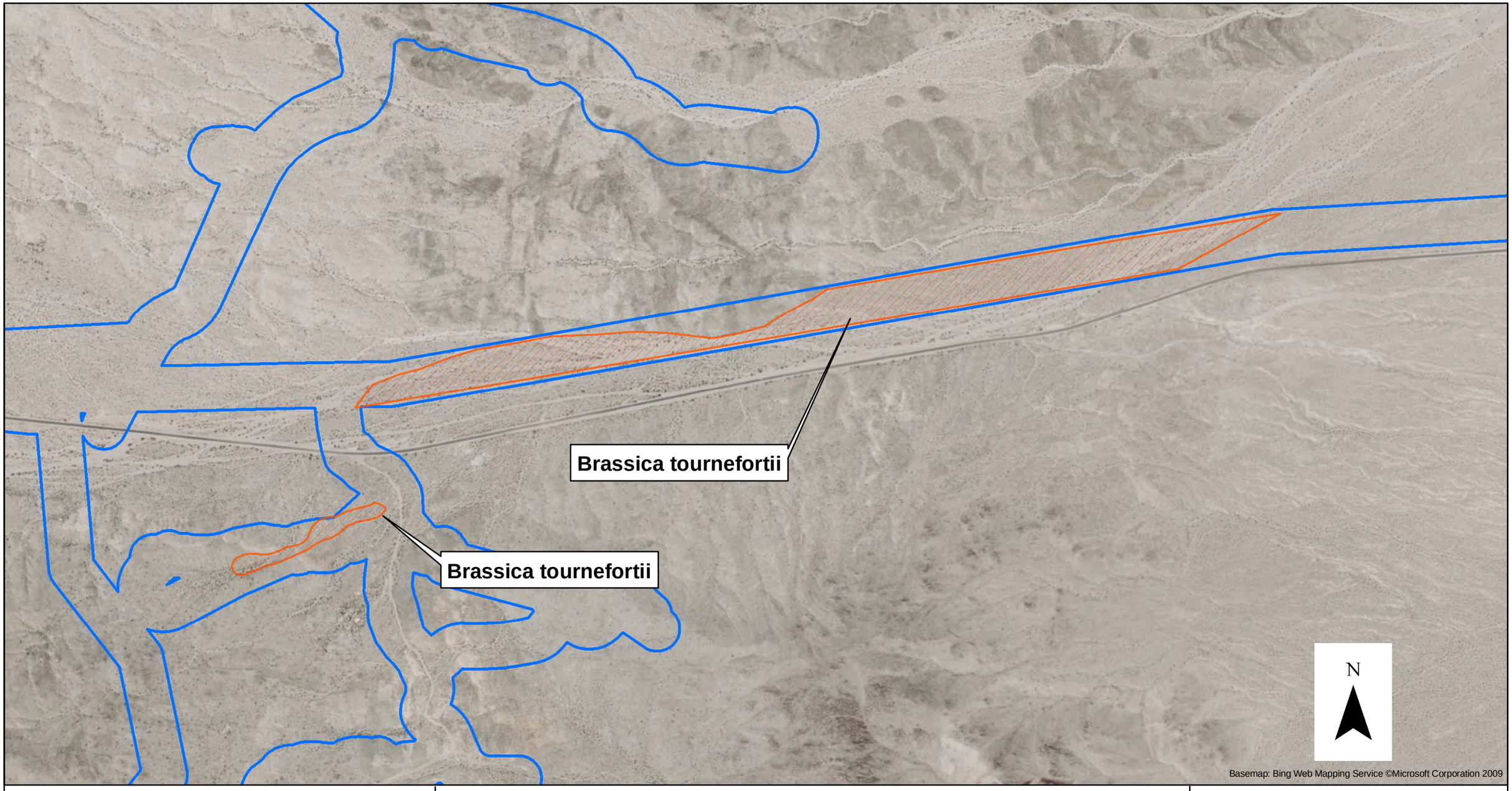
Scale 1:35,000

Project Number: 09-1034

Date: 11/17/2010

Plate 6
Plant Locations

Alphabiota



Legend

Brassica tournefortii
(species observed in these areas)

Survey Corridor
(200 ft. from centerline)

Searchlight Wind Farm

0 1,000 2,000 3,000 Feet

Scale 1:10,000

Project Number: 09-1034

Date: 11/17/2010

Plate 8
Brassica tournefortii

Alphabiota
ENVIRONMENTAL CONSULTING

Appendix C

APPENDIX C

APPROVED HERBICIDES FOR USE ON BLM LANDS*

				Update November 13, 2009	
	STATES WITH APPROVAL				
	BASED UPON CURRENT				
ACTIVE	**EIS/ROD & COURT**			**EPA REG.**	**CA**
INGREDIENT	**INJUNCTIONS**	**TRADE NAME**	**MANUFACTURER**	**NUMBER**	**REG. ****
Bromacil	AK, AZ, CA, CO, ID, MT, ND,	Bromacil 80DF	Alligare, LLC	81927-4	Y
	NE, NM, NV, OK, SD, TX, UT,	Hyvar X	DuPont	352-287	Y
	WA, WY	Hyvar XL	DuPont	352-346	Y
Bromacil +	AK, AZ, CA, CO, ID, MT, ND,	Bromacil/Diuron 40/40	Alligare, LLC	81927-3	Y
Diuron	NE, NM, NV, OK, SD, TX, UT,	Krovar I DF	DuPont	352-505	Y
	WA, WY	Weed Blast Res. Weed Cont.	Loveland Products Inc.	34704-576	N
		DiBro 2+2	Nufarm Americas Inc.	228-227	Y
		DiBro 4+4	Nufarm Americas Inc.	228-235	N
		DiBro 4+2	Nufarm Americas Inc.	228-386	N
		Weed Blast 4G	SSI Maxim	34913-19	N
Chlorsulfuron	AK, AZ, CA, CO, ID, MT, ND,	Telar DF	DuPont	352-522	Y
	NE, NM, NV, OK, SD, TX, UT,	Telar XP	DuPont	352-654	Y
	WA, WY	NuFarm Chlorsulf Pro 75 WDG Herbicide	Nufarm Americas Inc.	228-672	N
		Chlorsulfuron E-Pro 75 WDG	Nufarm Americas Inc.	79676-72	N
Clopyralid	AK, AZ, CA, CO, ID, MT, ND,	Spur	Albaugh, Inc.	42750-89	N
	NE, NM, NV, OK, SD, TX, UT,	Pyramid R&P	Albaugh, Inc.	42750-94	N
	WA, WY	Clopyralid 3	Alligare, LLC	42750-94-81927	Y
		Cody Herbicide	Alligare, LLC	81927-28	Y
		Reclaim	Dow AgroSciences	62719-83	N
		Stinger	Dow AgroSciences	62719-73	Y
		Transline	Dow AgroSciences	62719-259	Y
		CleanSlate	Nufarm Americas Inc.	228-491	Y

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APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Clopyralid +	AK, AZ, CA, CO, ID, MT, ND,	Commando	Albaugh, Inc.	42750-92	N
2,4-D	NE, NM, NV, OK, SD, TX, UT,	Curtail	Dow AgroSciences	62719-48	N
	WA, WY	Cutback	Nufarm Americas Inc.	71368-72	N
2,4-D	AK, AZ, CA, CO, ID, MT, ND,	Agrisolution 2,4-D LV6	Agriliance, L.L.C.	1381-101	N
	NE, NM, NV, OK, OR, SD, TX,	Agrisolution 2,4-D Amine 4	Agriliance, L.L.C.	1381-103	N
	UT, WA, WY	Agrisolution 2,4-D LV4	Agriliance, L.L.C.	1381-102	N
		2,4-D Amine 4	Albaugh, Inc./Agri Star	42750-19	Y
		2,4-D LV 4	Albaugh, Inc./Agri Star	42750-15	Y
		Solve 2,4-D	Albaugh, Inc./Agri Star	42750-22	Y
		2,4-D LV 6	Albaugh, Inc./Agri Star	42750-20	N
		Five Star	Albaugh, Inc./Agri Star	42750-49	N
		D-638	Albaugh, Inc./Agri Star	42750-36	N
		2,4-D LV6	Helena Chem. Co.	4275-20-5905	N
		2,4-D Amine	Helena Chem. Co.	5905-72	N
		Opti-Amine	Helena Chem. Co.	5905-501	N
		Barrage HF	Helena	5905-529	N
		HardBall	Helena	5905-549	N
		Unison	Helena	5905-542	N
		Amine 4CA 2,4-D Weed Killer	Loveland Products Inc.	34704-5	Y
		Clean Amine	Loveland Products Inc.	34704-120	N
		Low Vol 4 Ester Weed Killer	Loveland Products Inc.	34704-124	N
		Low Vol 6 Ester Weed Killer	Loveland Products Inc.	34704-125	N
		LV-6 Ester Weed Killer	Loveland Products Inc.	34704-6	Y
		Saber	Loveland Products Inc.	34704-803	N
		Saber CA	Loveland Products Inc.	34704-803	Y
		Salvo	Loveland Products Inc.	34704-609	N
		Savage DF	Loveland Products Inc.	34704-606	Y
		Aqua-Kleen	Nufarm Americas Inc.	71368-4	N
		Aqua-Kleen	Nufarm Americas Inc.	228-378	N
		Esteron 99C	Nufarm Americas Inc.	62719-9-71368	N
		Weedar 64	Nufarm Americas Inc.	71368-1	Y
		Weedone LV-4	Nufarm Americas Inc.	228-139-71368	Y

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APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
2,4-D - cont.	AK, AZ, CA, CO, ID, MT, ND,	Weedone LV-4 Solventless	Nufarm Americas Inc.	71368-14	Y
	NE, NM, NV, OK, OR, SD, TX,	Weedone LV-6	Nufarm Americas Inc.	71368-11	Y
	UT, WA, WY	Formula 40	Nufarm Americas Inc.	228-357	Y
		2,4-D LV 6 Ester	Nufarm Americas Inc.	228-95	Y
		Platoon	Nufarm Americas Inc.	228-145	N
		WEEDstroy AM-40	Nufarm Americas Inc.	228-145	Y
		Hi-Dep	PBI Gordon Corp.	2217-703	N
		2,4-D Amine	Setre (Helena)	5905-72	N
		Barrage LV Ester	Setre (Helena)	5905-504	N
		2,4-D LV4	Setre (Helena)	5905-90	N
		2,4-D LV6	Setre (Helena)	5905-93	N
		Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA	Y
		Clean Crop Low Vol 6 Ester	UAP-Platte Chem. Co.	34704-125	N
		Salvo LV Ester	UAP-Platte Chem. Co.	34704-609	N
		2,4-D 4# Amine Weed Killer	UAP-Platte Chem. Co.	34704-120	N
		Clean Crop LV-4 ES	UAP-Platte Chem. Co.	34704-124	N
		Savage DF	UAP-Platte Chem. Co.	34704-606	Y
		Cornbelt 4 lb. Amine	Van Diest Supply Co.	11773-2	N
		Cornbelt 4# LoVol Ester	Van Diest Supply Co.	11773-3	N
		Cornbelt 6# LoVol Ester	Van Diest Supply Co.	11773-4	N
		Amine 4	Wilbur-Ellis Co.	2935-512	N
		Lo Vol-4	Wilbur-Ellis Co.	228-139-2935	N
		Lo Vol-6 Ester	Wilbur-Ellis Co.	228-95-2935	N
		Agrisolution 2,4-D LV6	Winflied Solutions, LLC	1381-101	N
		Agrisolution 2,4-D Amine 4	Winfield Solutions, LLC	1381-103	N
		Agrisolution 2,4-D LV4	Winfield Solutions, LLC	1381-102	N
Dicamba	AK, AZ, CA, CO, ID, MT, ND,	Dicamba DMA	Albaugh, Inc./Agri Star	42750-40	N
	NE, NM, NV, OK, OR, SD, TX,	Vision	Albaugh, Inc.	42750-98	N
	UT, WA, WY	Cruise Control	Alligare, LLC	42750-40-81927	N
		Banvel	Arysta LifeScience N.A. Corp.	66330-276	Y
		Clarity	BASF Ag. Products	7969-137	Y
		Rifle	Loveland Products Inc.	34704-861	Y

APPENDIX C

APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Dicamba - cont.	AK, AZ, CA, CO, ID, MT, ND,	Banvel	Micro Flo Company	51036-289	Y
	NE, NM, NV, OK, OR, SD, TX,	Diablo	Nufarm Americas Inc.	228-379	Y
	UT, WA, WY	Vanquish Herbicide	Nufarm Americas Inc.	228-397	Y
		Vanquish	Syngenta	100-884	N
		Sterling Blue	Winfield Solutions, LLC	7969-137-1381	Y
Dicamba +	AK, AZ, CA, CO, ID, MT, ND,	Outlaw	Albaugh, Inc./Agri Star	42750-68	N
2,4-D	NE, NM, NV, OK, OR, SD, TX,	Range Star	Albaugh, Inc./Agri Star	42750-55	N
	UT, WA, WY	Weedmaster	BASF Ag. Products	7969-133	Y
		Rifle-D	Loveland Products Inc.	34704-869	N
		KambaMaster	Nufarm Americas Inc.	71368-34	N
		Veteran 720	Nufarm Americas Inc.	228-295	Y
		Brash	Winfield Solutions, LLC	1381-202	N
Dicamba +	AZ, CO, ID, MT, ND, NE, NM,	Distinct	BASF Ag. Products	7969-150	N
Diflufenzopyr	NV, OK, SD, TX, UT, WA, WY	Overdrive	BASF Ag. Products	7969-150	N
Diquat	AK, AZ, CA, CO, ID, MT, ND, NE,	Reward	Syngenta Crop Prot., Inc.	100-1091	Y
	NM, NV, OK, SD, TX, UT, WA, WY	NuFarm Diquat Pro 2L Herbicide	Nufarm Americas Inc.	228-675	N
		Nufarm Diquat 2L Herbicide	Nufarm Americas Inc.	228-675	N
		Diquat E-Pro 2L	Nufarm Americas Inc.	79676-75	Y
Diuron	AK, AZ, CA, CO, ID, MT, ND,	Diuron 80DF	Agriliance, L.L.C.	9779-318	N
	NE, NM, NV, OK, SD, TX, UT,	Diuron 80DF	Alligare, LLC	81927-12	Y
	WA, WY	Karmex DF	DuPont	352-692	Y
		Karmex XP	DuPont	352-692	Y
		Karmex IWC	DuPont	352-692	Y
		Direx 4L	DuPont	352-678	Y
		Direx 80DF	Griffin Company	1812-362	Y
		Direx 4L	Griffin Company	1812-257	Y
		Diuron 4L	Loveland Products Inc.	34704-854	Y
		Diuron 80 WDG	Loveland Products Inc.	34704-648	N
		Diuron 4L	Makteshim Agan of N.A.	66222-54	N

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APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Diuron - cont.	AK, AZ, CA, CO, ID, MT, ND,	Diuron 80WDG	UAP-Platte Chem. Co.	34704-648	N
	NE, NM, NV, OK, SD, TX, UT,	Vegetation Man. Diuron 80 DF	Vegetation Man., LLC	66222-51-74477	N
	WA, WY	Diuron-DF	Wilbur-Ellis	00352-00-508-02935	N
		Diuron 80DF	Winfield Solutions, LLC	9779-318	N
Fluridone	AK, AZ, CA, CO, ID, MT, ND,	Avast!	SePRO	67690-30	Y
	NE, NM, NV, OK, SD, TX, UT,	Sonar AS	SePRO	67690-4	Y
	WA, WY	Sonar Precision Release	SePRO	67690-12	Y
		Sonar Q	SePRO	67690-3	Y
		Sonar SRP	SePRO	67690-3	Y
Glyphosate	AK, AZ, CA, CO, ID, MT, ND,	Aqua Star	Albaugh, Inc./Agri Star	42750-59	Y
	NE, NM, NV, OK, OR, SD, TX,	Forest Star	Albaugh, Inc./Agri Star	42570-61	Y
	UT, WA, WY	Gly Star Original	Albaugh, Inc./Agri Star	42750-60	Y
		Gly Star Plus	Albaugh, Inc./Agri Star	42750-61	Y
		Gly Star Pro	Albaugh, Inc./Agri Star	42750-61	Y
		Glyphosate 4 PLUS	Alligare, LLC	81927-9	Y
		Glyphosate 5.4	Alligare, LLC	81927-8	Y
		Glyfos	Cheminova	4787-31	Y
		Glyfos PRO	Cheminova	67760-57	Y
		Glyfos Aquatic	Cheminova	4787-34	Y
		ClearOut 41	Chem. Prod. Tech., LLC	70829-2	N
		ClearOut 41 Plus	Chem. Prod. Tech., LLC	70829-3	N
		Accord Concentrate	Dow AgroSciences	62719-324	Y
		Accord SP	Dow AgroSciences	62719-322	Y
		Accord XRT	Dow AgroSciences	62719-517	Y
		Accord XRT II	Dow AgroSciences	62719-556	Y
		Glypro	Dow AgroSciences	62719-324	Y
		Glypro Plus	Dow AgroSciences	62719-322	Y
		Rodeo	Dow AgroSciences	62719-324	Y
		Mirage	Loveland Products Inc.	34704-889	Y
		Mirage Plus	Loveland Products Inc.	34704-890	Y
		Aquamaster	Monsanto	524-343	Y

APPENDIX C

APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Glyphosate - cont.	AK, AZ, CA, CO, ID, MT, ND,	Roundup Original	Monsanto	524-445	Y
	NE, NM, NV, OK, OR, SD, TX,	Roundup Original II	Monsanto	524-454	Y
	UT, WA, WY	Roundup Original II CA	Monsanto	524-475	Y
		Honcho	Monsanto	524-445	Y
		Honcho Plus	Monsanto	524-454	Y
		Roundup PRO	Monsanto	524-475	Y
		Roundup PRO Concentrate	Monsanto	524-529	Y
		Roundup PRO Dry	Monsanto	524-505	Y
		Roundup PROMAX	Monsanto	524-579	Y
		Aqua Neat	Nufarm Americas Inc.	228-365	Y
		Credit Xtreme	Nufarm Americas Inc.	71368-81	Y
		Foresters	Nufarm Americas Inc.	228-381	Y
		Razor	Nufarm Americas Inc.	228-366	Y
		Razor Pro	Nufarm Americas Inc.	228-366	Y
		GlyphoMate 41	PBI Gordon Corp.	2217-847	Y
		AquaPro Aquatic Herbicide	SePRO Corporation	62719-324-67690	Y
		Rattler	Setre (Helena)	524-445-5905	Y
		Buccaneer	Tenkoz	55467-10	Y
		Buccaneer Plus	Tenkoz	55467-9	Y
		Mirage Herbicide	UAP-Platte Chem. Co.	524-445-34704	Y
		Mirage Plus Herbicide	UAP-Platte Chem. Co.	524-454-34704	Y
		Glyphosate 4	Vegetation Man., LLC	73220-6-74477	Y
		Cornerstone	Winfield Solutions, LLC	1381-191	Y
		Cornerstone Plus	Winfield Solutions, LLC	1381-192	Y
		Rascal	Winfield Solutions, LLC	1381-191	N
		Rascal Plus	Winfield Solutions, LLC	1381-192	N
Glyphosate +	AK, AZ, CA, CO, ID, MT, ND,	Landmaster BW	Albaugh, Inc./Agri Star	42570-62	N
2,4-D	NE, NM, NV, OK, OR, SD, TX,	Campaign	Monsanto	524-351	N
	UT, WA, WY	Landmaster BW	Monsanto	524-351	N

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APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Glyphosate +	AK, AZ, CA, CO, ID, MT, ND,	Fallowmaster	Monsanto	524-507	N
Dicamba	NE, NM, NV, OK, OR, SD, TX,	GlyKamba	Nufarm Americas Inc.	71368-30	N
	UT, WA, WY				
Hexazinone	AK, AZ, CA, CO, ID, MT, ND,	Velpar ULW	DuPont	352-450	N
	NE, NM, NV, OK, SD, TX, UT,	Velpar L	DuPont	352-392	Y
	WA, WY	Velpar DF	DuPont	352-581	Y
		Pronone MG	Pro-Serve	33560-21	N
		Pronone 10G	Pro-Serve	33560-21	Y
		Pronone 25G	Pro-Serve	33560-45	N
Hexazinone +	AK, AZ, CO, ID, MT, ND, NE,	Westar	DuPont Crop Protection	352-626	Y
Sulfometuron methyl	NM, NV, OK, SD, TX, UT, WA, WY	Oustar	DuPont Crop Protection	352-603	Y
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS), the aerial application of these herbicides is prohibited.					
Imazapic	AZ, CO, ID, MT,ND, NE, NM,	Panoramic 2SL	Alligare, LLC	66222-141-81927	N
	NV, OK, SD, TX, UT, WA, WY	Plateau	BASF	241-365	N
		Imazapic E 2 SL	Etigra, LLC	79676-65	N
Imazapic +	AZ, CO, ID, MT,ND, NE, NM,	Journey	BASF	241-417	N
Glyphosate	NV, OK, SD, TX, UT, WA, WY				
Imazapyr	AK, AZ, CA, CO, ID, MT, ND,	Imazapyr 2SL	Alligare, LLC	81927-23	N
	NE, NM, NV, OK, SD, TX, UT,	Imazapyr 4SL	Alligare, LLC	81927-24	N
	WA, WY	Ecomazapyr 2SL	Alligare, LLC	81927-22	N
		Arsenal Railroad Herbicide	BASF	241-273	N
		Chopper	BASF	241-296	Y
		Arsenal Applicators Conc.	BASF	241-299	N
		Arsenal	BASF	241-346	N
		Arsenal PowerLine	BASF	241-431	N
		Stalker	BASF	241-398	N

APPENDIX C

APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Imazapyr - cont.	AK, AZ, CA, CO, ID, MT, ND,	Habitat	BASF	241-426	Y
	NE, NM, NV, OK, SD, TX, UT,	Imazapyr E-Pro 2 - VM &	Etigra, LLC	81959-8	Y
	WA, WY	Aquatic Herbicide			
		Imazapyr E-Pro 4 - Forestry	Etigra, LLC	81959-9	N
		Imazapyr E-Pro 2E - Site Prep & Basal	Etigra, LLC	81959-7	N
		Polaris	Nufarm Americas Inc.	228-534	Y
		Polaris AC	Nufarm Americas Inc.	241-299-228	Y
		Polaris AC	Nufarm Americas Inc.	228-480	Y
		Polaris AQ	Nufarm Americas Inc.	241-426-228	Y
		Polaris RR	Nufarm Americas Inc.	241-273-228	N
		Polaris SP	Nufarm Americas Inc.	228-534	Y
		Polaris SP	Nufarm Americas Inc.	241-296-228	Y
		Polaris Herbicide	Nufarm Americas Inc.	241-346-228	N
		SSI Maxim Arsenal 0.5G	SSI Maxim Co., Inc.	34913-23	N
		Ecomazapyr 2 SL	Vegetation Man., LLC	74477-6	N
		Imazapyr 2 SL	Vegetation Man., LLC	74477-4	N
		Imazapyr 4 SL	Vegetation Man., LLC	74477-5	N
Imazapyr +	AK, AZ, CA, CO, ID, MT, ND, NE,	Mojave 70 EG	Alligare, LLC	74477-9-81927	N
Diuron	NM, NV, OK, SD, TX, UT, WA, WY	Sahara DG	BASF	241-372	N
		Imazuron E-Pro	Etigra, LLC	79676-54	N
		SSI Maxim Topsite 2.5G	SSI Maxim Co., Inc.	34913-22	N
Imazapyr +	AK, AZ, CA, CO, ID, MT, ND,	Lineage Clearstand	DuPont	352-766	N
Metsulfuron methyl	NE, NM, NV, OK, SD, TX, UT,				
	WA, WY				

APPENDIX C

APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Imazapyr +	AK, AZ, CA, CO, ID, MT, ND,	Lineage HWC	DuPont	352-765	N
Sulfometuron methyl +	NE, NM, NV, OK, SD, TX, UT,	Lineage Prep	DuPont	352-767	N
Metsulfuron methyl	WA, WY				
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS), the aerial application of these herbicides is prohibited.					
Metsulfuron methyl	AK, AZ, CO, ID, MT, ND, NE,	MSM 60	Alligare, LLC	81927-7	N
	NM, NV, OK, SD, TX, UT, WA,	Escort DF	DuPont	352-439	N
	WY	Escort XP	DuPont	352-439	N
		MSM E-AG 60 EG Herbicide	Etigra, LLC	81959-14	N
		MSM E-Pro 60 EG Herbicide	Etigra, LLC	81959-14	N
		Patriot	Nufarm Americas Inc.	228-391	N
		PureStand	Nufarm Americas Inc.	71368-38	N
		Metsulfuron Methyl DF	Vegetation Man., L.L.C.	74477-2	N
Metsulfuron methyl +	AK, AZ, CO, ID, MT, ND, NE,	Cimarron Extra	DuPont	352-669	N
Chlorsulfuron	NM, NV, OK, SD, TX, UT, WA,	Cimarron Plus	DuPont	352-670	N
	WY				
Metsulfuron methyl +	AK, AZ, CO, ID, MT, ND, NE, NM	Cimarron MAX	DuPont	352-615	N
Dicamba + 2,4-D	NV, OK, SD, TX, UT, WA, WY				
Picloram	AZ, CO, ID, MT, ND, NE, NM,	Triumph K	Albaugh, Inc.	42750-81	N
	NV, OK, OR, SD, TX, UT, WA,	Triumph 22K	Albaugh, Inc.	42750-79	N
	WY	Picloram K	Alligare, LLC	42750-81-81927	N
		Picloram K	Alligare, LLC	81927-17	N
		Picloram 22K	Alligare, LLC	42750-79-81927	N
		Picloram 22K	Alligare, LLC	81927-18	N
		Grazon PC	Dow AgroSciences	62719-181	N
		OutPost 22K	Dow AgroSciences	62719-6	N
		Tordon K	Dow AgroSciences	62719-17	N
		Tordon 22K	Dow AgroSciences	62719-6	N
		Trooper 22K	Nufarm Americas Inc.	228-535	N

APPENDIX C

APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Picloram +	AZ, CO, ID, MT, ND, NE, NM,	GunSlinger	Albaugh, Inc.	42750-80	N
2,4-D	NV, OK, OR, SD, TX, UT, WA,	Picloram + D	Alligare, LLC	42750-80-81927	N
	WY	Picloram + D	Alligare, LLC	81927-16	N
		Tordon 101M	Dow AgroSciences	62719-5	N
		Tordon 101 R Forestry	Dow AgroSciences	62719-31	N
		Tordon RTU	Dow AgroSciences	62719-31	N
		Grazon P+D	Dow AgroSciences	62719-182	N
		HiredHand P+D	Dow AgroSciences	62719-182	N
		Pathway	Dow AgroSciences	62719-31	N
		Trooper 101	Nufarm Americas Inc.	228-561	N
		Trooper P + D	Nufarm Americas Inc.	228-530	N
Picloram +	AZ, CO, ID, MT, ND, NE, NM,	Trooper Extra	Nufarm Americas Inc.	228-586	N
2,4-D +	NV, OK, OR, SD, TX, UT, WA,				
Dicamba	WY				
Sulfometuron methyl	AK, AZ, CA, CO, ID, MT, ND,	SFM 75	Alligare, LLC	81927-26	Y
	NE, NM, NV, OK, SD, TX, UT	Oust DF	DuPont	352-401	N
	WA, WY	Oust XP	DuPont	352-601	Y
		SFM E-Pro 75EG	Etigra, LLC	79676-16	Y
		Spyder	Nufarm Americas Inc.	228-408	Y
		SFM 75	Vegetation Man., L.L.C.	72167-11-74477	Y
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS), the aerial application of these herbicides is prohibited.					
Sulfometuron methyl +	AK, AZ, CA, CO, ID, MT, ND,	Landmark XP	DuPont	352-645	Y
Chlorsulfuron	NE, NM, NV, OK, SD, TX, UT				
	WA, WY				
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS), the aerial application of this herbicide is prohibited.					

APPENDIX C

APPROVED HERBICIDES FOR USE ON BLM LANDS*

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Sulfometuron methyl +	AK, AZ, CA, CO, ID, MT, ND, NE,	Oust Extra	DuPont	352-622	N
Metsulfuron methyl	NM, NV, OK, SD, TX, UT, WA, WY				
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS), the aerial application of this herbicide is prohibited.					
Tebuthiuron	AZ, CA, CO, ID, MT, ND, NE,	Spike 20P	Dow AgroSciences	62719-121	Y
	NM, NV, OK, SD, TX, UT, WA,	Spike 80DF	Dow AgroSciences	62719-107	Y
	WY	SpraKil S-5 Granules	SSI Maxim Co., Inc.	34913-10	Y
Tebuthiuron +	AZ, CA, CO, ID, MT, ND, NE, NM,	SpraKil SK-13 Granular	SSI Maxim Co., Inc.	34913-15	Y
Diuron	NV, OK, SD, TX, UT, WA, WY	SpraKil SK-26 Granular	SSI Maxim Co., Inc.	34913-16	Y
Triclopyr	AK, AZ, CA, CO, ID, MT, ND,	Triclopyr 4EC	Alligare, LLC	72167-53-74477	Y
	NE, NM, NV, OK, SD, TX, UT	Triclopyr 3	Alligare, LLC	81927-13	Y
	WA, WY	Triclopry 4	Alligare, LLC	81927-11	Y
		Element 3A	Dow AgroSciences	62719-37	Y
		Element 4	Dow AgroSciences	62719-40	Y
		Forestry Garlon XRT	Dow AgroSciences	62719-553	Y
		Garlon 3A	Dow AgroSciences	62719-37	Y
		Garlon 4	Dow AgroSciences	62719-40	Y
		Garlon 4 Ultra	Dow AgroSciences	62719-527	Y
		Remedy	Dow AgroSciences	62719-70	Y
		Remedy Ultra	Dow AgroSciences	62719-552	Y
		Pathfinder II	Dow AgroSciences	62719-176	Y
		Relegate	Nufarm Americas Inc.	228-521	Y
		Tahoe 3A	Nufarm Americas Inc.	228-384	Y
		Tahoe 3A	Nufarm Americas Inc.	228-518	Y
		Tahoe 3A	Nufarm Americas Inc.	228-520	Y
		Tahoe 4E	Nufarm Americas Inc.	228-385	Y
		Tahoe 4E Herbicide	Nufarm Americas Inc.	228-517	Y
		Renovate 3	SePRO Corporation	62719-37-67690	Y
		Renovate OTF	SePRO Corporation	67690-42	Y
		Ecotriclopyr 3 SL	Vegetation Man., LLC	72167-49-74477	N
		Triclopyr 3 SL	Vegetation Man., LLC	72167-53-74477	N

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ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD & COURT INJUNCTIONS	TRADE NAME	MANUFACTURER	EPA REG. NUMBER	CA REG. **
Triclopyr +	AK, AZ, CA, CO, ID, MT, ND,	Everett	Alligare, LLC	81927-29	Y
2,4-D	NE, NM, NV, OK, SD, TX, UT,	Crossbow	Dow AgroSciences	62719-260	Y
	WA, WY	Candor	Nufarm Americas Inc.	228-565	Y
Triclopyr +	AK, AZ, CA, CO, ID, MT, ND,	Prescott Herbicide	Alligare, LLC	81927-30	Y
Clopyralid	NE, NM, NV, OK, SD, TX, UT,	Redeem R&P	Dow AgroSciences	62719-337	Y
	WA, WY	Brazen	Nufarm Americas Inc.	228-564	Y

* Refer to the complete label prior to considering the use of any herbicide formulation. Label changes can impact the intended use through, such things as, creation or elimination of Special Local Need (SLN) or 24 (c) registrations, changes in application sites, rates and timing of application, county restrictions, etc.

** Just because a herbicide has a Federal registration, and is approved under the current EIS, it may or may not be registered for use in California. This column identifies those formulations for which there is a California registration.

Appendix B-2: USFWS Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
Ph: (702) 515-5230 ~ Fax: (702) 515-5231

September 26, 2012
File No. 84320-2012-F-0211

Memorandum

To: Assistant Field Manager, Division of Renewable Resources, Bureau of Land Management, Las Vegas Field Office, Las Vegas, Nevada

From: State Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada

Subject: Biological Opinion for the Searchlight Wind Energy Project, Clark County, Nevada

As requested in your April 12, 2012, memorandum, attached is the Fish and Wildlife Service's (Service) biological opinion for the Searchlight Wind Energy Project. The Bureau of Land Management (BLM) determined that the proposed approval of issuance of a right-of-way grant for the subject project may adversely affect the Mojave desert tortoise (*Gopherus agassizii*), a species listed as threatened under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). In addition, BLM determined that the project may adversely affect designated Mojave desert tortoise critical habitat.

The attached biological opinion is based on information provided in your memoranda dated April 12, 2012; the March 2012, biological assessment for the project; discussions and electronic transmissions among the Service and BLM, the project consultant (Tetra Tech); and our files. A complete project file of this consultation is available in the Service's Nevada Fish and Wildlife Office in Las Vegas.

If you require additional assistance concerning the biological opinion, please contact Susan Cooper in the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230. Please reference File No. 84320-2012-F-0211 in future correspondence concerning this consultation.

In addition, the Service has a legal mandate and trust responsibility to maintain healthy, migratory bird populations for the benefit of the American public pursuant to the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 *et seq.*), and the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d). The Eagle Act prohibits a variety of actions with respect to eagles, including their "take." "Take" under the Eagle Act is defined as "pursue, shoot, shoot at,

poison, wound, kill, capture, trap, collect, or molest or disturb." Anyone who takes an eagle is in violation of the Eagle Act unless the take has been authorized by the Secretary of the Interior (see 50 C.F.R 22.26, 22.27). No one is required to seek a permit for any activity; however, where an activity results in take, it is a violation of the Eagle Act unless a permit authorizing that take has been obtained prior to the action.

The construction and operation of the Searchlight Wind Project has the potential to result in the "take" of golden eagles. We appreciate the efforts by the BLM and Duke Energy to develop a Bird and Bat Conservation Strategy (BBCS) for the project. Under the Service's current direction we recommend energy proponents develop an Eagle Conservation Plan to address potential project impacts to eagles and develop a BBCS to identify minimization and avoidance measures to address impacts to other migratory bird species. We encourage Duke Energy to continue to coordinate with the Service to develop an Eagle Conservation Plan in a manner that would be consistent with the Service's goal of maintaining a stable or increasing breeding population for golden eagles, and then to apply for a golden eagle programmatic take permit. We encourage the BLM and Duke Energy to continue your coordination with Dr. Chris Nicolai [chris_nicolai@fws.gov, (775-861-6333)] and Ms. Heather Beeler [heather_ beeler@fws.gov, (916- 414-6651)] with our Migratory Bird Program with respect to compliance with the Eagle Act for the Searchlight Wind Project.

Edward D. Koch
State Supervisor

cc:
Supervisory Biologist – Habitat, Nevada Department of Wildlife, Las Vegas, Nevada

ATTACHMENT

BIOLOGICAL OPINION
FILE NO. 84320-2012-F-0211

CONSULTATION HISTORY

On April 30, 2009, Tetra Tech, a consultant to Duke Energy (Duke), contacted the Fish and Wildlife Service (Service) on behalf of the Bureau of Land Management (BLM) requesting information regarding sensitive species potentially occurring near the proposed Searchlight Wind Energy Facility (SWEF). On June 10, 2009, the Service responded to this request (84320-2009-SL-0343), identifying the occurrence of the Mojave desert tortoise (*Gopherus agassizii*) (hereafter, desert tortoise or tortoise) in the project area.

On February 28, 2012, Tetra Tech, BLM, and Service personnel conducted a visit to the project site to review the occupied desert tortoise habitat where project features would occur. Discussion topics included minimization measures, post-construction monitoring, project access, and project features.

On April 12, 2012, the Service received BLM's request for consultation and biological assessment (Tetra Tech 2012) for the subject project and determined the submitted materials were sufficient to initiate consultation.

On August 16, 2012, the Service sent BLM a notification of a 60-day extension for the consultation to allow the Service additional time for review of the draft biological opinion.

DESCRIPTION OF THE PROPOSED ACTION

Searchlight Wind Energy, LLC (Searchlight Wind; Applicant) a wholly-owned subsidiary of Duke has applied to BLM for a right-of-way (ROW) grant on public land to develop a wind energy project (NVN-084626). Searchlight Wind is proposing to develop a 200-megawatt (MW) wind energy facility on a site located in southern Clark County, Nevada (Figure 1). Western Area Power Administration (WAPA) proposes to construct, operate, and maintain a new switching station to interconnect the SWEF project and has submitted a ROW application (NVN-086777) to BLM for construction and operation of the switching station. The interconnection switching station is analyzed as part of the proposed action.

The project area for the proposed action lies to the north of the Newberry and south of the Eldorado Mountain ranges in southern Clark County, Nevada. It is situated approximately 1.5 miles west of Lake Mead National Recreation Area, 60 miles southeast of Las Vegas and 40 miles north of Laughlin, Nevada. Specifically, the project area for the proposed action

encompasses lands approximately 0.5 mile northeast to 3 miles southeast of the town of Searchlight (Figure 1).

The footprint of the proposed action occurs within a project area that is approximately 8,400 acres of land, of which approximately 388.5 acres of habitat would be disturbed. Included in the 388.5 acres is the 7 acres of disturbance needed for the WAPA interconnection switching station, which would occur in Mojave desert tortoise critical habitat (CH) (Service 2011). Although the location of the proposed interconnection switching station falls within CH, it would be located within 0.5 mile of State Route 164 (SR-164), a Federal aid designated highway traversing the Area of Critical Environmental Concern (ACEC). Development within BLM ACECs (and thus CH in the case of the project) is allowable under BLM's Resource Management Plan when development is within 0.5 mile of Federal aid highways.

Facilities and Structures

Wind Turbines

The proposed action would involve the construction of 87 2.3-MW wind turbine generators (WTG) that would provide up to 200 MW of electricity. Wind turbines consist of three principal components that would be assembled and erected during construction: the tower, the nacelle, and the rotor assembly. The Applicant proposes to use the Siemens Model 2.3-101 MW WTG with a 331-foot rotor diameter on a 262-foot tower (turbine hub height). These modern wind turbines would have maximum height of up to 427.5 feet with three mounted rotor blades, each 165 feet in length.

Access Roads

All roads would be constructed for the specific purpose of the proposed action and be used as primary access routes for all larger turbine components delivered to the project area, as well as for construction, operation and maintenance crews, and smaller materials delivery. They would be located to minimize ground disturbance, avoid sensitive resources (e.g., biological habitat) and maximize transportation efficiency.

Regional and local access to the area would be via U.S. Highway (US-95) and SR-164. Access to the proposed project facilities would be provided by newly constructed extensions of existing north and south access roads, and upgraded or partially realigned (to reduce maximum grade to 10 percent or less, or to increase the inside radius of turns on the road) existing access roads that begin from US-95 and SR-164. New roads would link the individual turbines, substations, and other project facilities.

From the north end of Fourth of July Mountain, the existing road from SR-164 would be upgraded to a gravel road and would be the primary access route for all larger turbine components. New gravel turbine string roads would be constructed to link the turbines. The turbine string roads would be designed to enable the transport of large cranes between each

individual turbine site. New short spur roads would be constructed along the turbine strings to access each individual turbine.
Each turbine manufacturer has slightly different equipment transport and crane requirements. These requirements dictate road width and road turn radius. Although the Applicant has proposed using the Siemens 2.3 MW WTG, the type and brand of turbines installed would be determined by commercial factors within the timeframe of the proposed action schedule. To allow safe passage of the large transport equipment used in construction, gravel roads would be built which consist of an aggregate road base over compacted native material per geotechnical recommendations, and with adequate drainage and compaction to handle 15-ton-per-axle leads. Road widths would range between 16 and 36 feet. BLM would require that all roads be designed, built, surfaced, and maintained to minimize ground disturbance, and to provide safe operating conditions at all times.

Electrical System
Each wind turbine would generate electricity at approximately 690 volts. The low voltage from each turbine generator would be increased via a pad-mounted transformer located at each turbine to the 34.5-kV level required for the medium-voltage collector system. The power collection system would consist of medium-voltage, high-density, insulated underground cables that connect each turbine transformer to one of two on-site substations. These underground cables would be buried in trenches located adjacent to the roadbed of the turbine connector roads, wherever technically feasible. At the substations, voltage would be further increased to 230 kV. The two on-site substations would be connected with a 6.1-mile, 230-kV overhead transmission line. The stepped-up power would then be delivered from the northern substation through the 2.6-mile transmission interconnect line to the proposed WAPA switching station, which would provide an interconnection with WAPA's Davis-Mead transmission line.

Underground Communications System
The wind turbine generators would be operated via a Supervisory Control and Data Acquisition (SCADA) system mounted on the control panel inside the tower of each WTG. Each turbine would be connected via fiber optic cable to a central computer in an operation and maintenance (O&M) building. Data could be accessed, and the WTGs could be controlled, either on site or remotely. The fiber optic communications cable would be co-located with the electrical collection system to reduce environmental impacts. Where feasible, collection cabling and communication lines would be co-located with roads to minimize environmental impacts.

Substations
Two project substations are proposed: one in the northeastern portion of the project area (adjacent to SR-164) and one in the southern portion of the project site (south of Tip Top Well Road). The proposed substations' main functions would be to step-up the voltage from the collection lines (34.5 kV) to the transmission line level (230 kV) and to provide electrical fault protection. Based on the transmission system studies conducted by WAPA, the Applicant would install capacitor banks at each of the two project 230-kV substations. The basic elements of the step-up substation facilities would be a control house, one or two main transformers, outdoor

breakers, capacitor banks, relaying equipment, high-voltage bus work, steel support structures, an underground grounding grid, and overhead lightning suppression conductors. All of the main outdoor electrical equipment and control house would be installed on a concrete foundation. Each substation site would consist of a graveled footprint area of approximately 1.5 acres, a 12-foot chain link perimeter fence, and an outdoor lighting system.

Transmission Lines

Overhead 230-kV transmission lines are proposed for the 6.1-mile transmission line. This proposed line would connect the two project substations and the 2.6-mile transmission line to a proposed interconnection switching station (WAPA) to connect with the 230-kV Davis-Mead transmission line. The Applicant proposes to support the transmission line conductors from steel monopole structures. Each monopole structure would be approximately 80 to 100 feet tall and be spaced at approximately 500-foot intervals. The 230-kV transmission line conductors would maintain the required National Electrical Safety Code (NESC) clearances of 22.5 feet for 230 kV over terrain subject to vehicular traffic plus an additional safety buffer (typically 5 feet). The conductor would be attached to the structures at varying heights to maintain the required NESC wire-to-ground clearances between structures.

The design for the 2.6-mile transmission line to WAPA's proposed switching station would be subject to WAPA's review and may be modified to meet WAPA's requirements during the design phase for the proposed project. In addition, WAPA would require the installation of an overhead optical ground wire containing fiber optics to provide communication between WAPA's proposed switching station and the Applicant's system.

The Collection System would be a buried conductor tying several of the WTGs together in a circuit to collect the power generated at the WTGs and routing that power to the project substation where it would be stepped up to the 230-kV transmission voltage. At several locations along the transmission lines, it may be advantageous to install the Collection System Conductor aboveground due to elevation changes, limited easement, cost of installation, minimization of environmental impact, and geotechnical conditions which would not allow it to be buried. An underbuilt circuit on the 2.6-mile transmission line to WAPA's proposed switching station would be subject to WAPA's review.

Meteorological Towers

Four permanent anemometer (wind measurement) towers have been installed at strategic locations along the turbine strings. These meteorological towers are approximately 180 to 200 feet (55 to 60 meters) in height and have anemometers mounted at varying distances above the ground. Information collected from the anemometers would be relayed to the O&M building via the proposed project's communication system. The meteorological towers have been constructed of tubular steel structures and are perch-discouraging for raptors and other large birds.

O&M Facility

The O&M facility would be located east of the town of Searchlight and along the south side of SR-164. The O&M facility would include a main building with offices, spare parts storage, restrooms, a septic system, a shop area, outdoor parking facilities, a turnaround area for larger vehicles, outdoor lighting, and a gated access with partial or full-perimeter fencing. Power for the O&M facility would come from the local electric grid. The O&M building would have a foundation footprint of approximately 60 by 140 feet. The projected permanent footprint of the O&M facility (including parking area) would be approximately 5 acres. The building would be of composite materials constructed or painted to match the surrounding landscape color. Portable water supplies would be used in the building, and sewage disposal would be by means of an onsite septic tank. Telecommunication lines and SCADA system would be installed.

Construction

The proposed action would use standard construction procedures used for other wind power projects in the western United States. These procedures, with minor modification to allow for site-specific circumstances and differences among turbine manufacturers, are summarized below. Additionally, project construction and operations would follow BLM's best management practices (BMPs) as described in the Appendix B of BLM's biological assessment. Construction is anticipated to continue for approximately 8 months.

Traffic

Construction of the proposed project roads, facilities, transmission lines, and electrical/communication lines would occur at approximately the same time, using individual vehicles for multiple tasks. During the construction period, there would be approximately 60 round trips per day to the site on existing roads by vehicles transporting construction personnel and small equipment. Over the entire construction period, there would be a maximum of 625 trips of large trucks delivering the turbine components and related equipment to the site. In addition, there would be more than 9,025 truck trips by dump trucks, concrete trucks, water trucks, cranes, and other construction and trade vehicles.

A traffic management plan would be prepared for project construction to minimize hazards from the increased truck traffic and to minimize impacts on traffic flow on local roads and highways. This plan would incorporate measures, such as informational signs, traffic flaggers when equipment may result in blocked throughways, traffic cones, and flashing lights, to identify any necessary changes in temporary road configuration. During construction, refueling and maintaining vehicles that are authorized for highway travel would be performed off site at an appropriate facility. Construction vehicles that are not highway-authorized would be serviced on the project site by a maintenance crew using a specially designed vehicle maintenance truck.

Road Construction

The minimum full-surfaced width for project access roads would be 16 feet. The roadways connecting turbine sites would be 16 feet wide with 10 foot shoulders needed for movement of

the turbine erection crane. Cut-and-fill slopes would be at a ratio of two horizontal to one vertical making actual cleared area for construction (inclusive of grade, shoulder and road) between 36 and 48 feet depending on topography. Equipment clearance would require a minimum inside radius of 148 feet at all turns, and would be graded to within no more than 6 inches of rise or drop in any 50-foot length. Turnouts may be needed to allow for safe passing of construction vehicles and would be 16 feet wide and 210 feet long. Road shoulders would be removed and restored post construction.

No material quarries would be located on BLM or other Federal lands. Any needed fill or road base material in excess of that generated from road cut activities would be obtained from a licensed, certified weed free off-site private source. Weed free topsoil removed during road construction would be stockpiled at project laydown areas. The stockpiled topsoil would be spread on cut-and-fill slopes, and then re-vegetated following guidelines in the SWEF Reclamation, Restoration, and Revegetation Plan upon completion of road construction.

Construction traffic would be restricted to the roads developed for the project. Use of existing, unimproved roads would be for emergency situations only. Along all roads, flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents. To avoid unnecessary impacts on vegetation, construction equipment would be limited to construction corridors and to designated staging/equipment laydown area footprints. Additional information on vehicle speeds is described in the *Conservation Measures* section below (Conservation Measure 10).

To help limit the spread and establishment of an invasive plant species community within disturbed areas, prompt establishment of the desired vegetation would be required. Seeding and transplanting would occur as soon as possible during the optimal period after construction using certified "weed-free" seed and native species to the extent possible, in a mix prescribed by BLM and methods described in the Weed Management Plan.

Laydown Areas

Two temporary laydown areas would be required near the proposed electrical substation locations. Access to the laydown areas would be via existing but upgraded roads leading from US-95 north of Searchlight and SR-164 east of Searchlight. The laydown areas would be temporary and used during construction only. Each laydown area would be approximately 10 acres and may be fenced for security for the duration of its use. Areas of identified sensitive habitat near laydown areas would be fenced off with caution tape to prevent damage. During construction, equipment, cable, foundation parts, components, towers, blades, nacelles, etc., may be temporarily stored either at one of the two laydown areas, or in temporary laydown areas at the base of each WTG location. All equipment and components would be supported on wooden frames, pallets, or straw bales, which would be placed on the ground while turbine components are loaded, pre-assembled, or awaiting installation. A mobile concrete batch plant and rock crusher would be located within one laydown area and relocated to the other as necessary during construction.

Turbine Pads and Foundations

At the location of each turbine pad, an assembly area would be required for off-loading, storage, and assembly of up to three tower sections, nacelle, rotor hub, and blades, called a lay down area. In level or near-level terrain, this laydown area would not need to be graded or cleared of vegetation. If the terrain is not level, the laydown area would be cleared and graded to create a level surface. Construction access to this area would be limited to wheeled vehicles and due to activity, some crushing of vegetation and soil compaction would be expected. Within this laydown area, a smaller section of approximately 60-foot by 60-foot area would be cleared of vegetation and graded. The cleared and graded area would facilitate construction of the turbine foundation.

To allow a large, track-mounted crane to access the turbine foundations, a crane pad would be constructed adjacent to the turbine access road. It would be constructed using standard cut-and-fill compacted road construction procedures. To allow the crane to safely lift the large and extremely heavy turbine components, the crane pad must be nearly flat. Wind turbine foundation designs would be based on the load requirements of the selected WTG and the load-bearing characteristics of the soil. Prior to construction, geotechnical investigations would be conducted to determine the soil characteristics at each WTG location. These geotechnical data would assist the project proponent in the selection of the appropriate WTG foundation type.

A typical foundation for a 2.3-MW WTG would be a reinforced concrete spread foundation resting directly on soil approximately 10 feet belowground. The foundation generally would be an octagon shape from 40 to 60 feet wide with a concrete pier on the top of the mat extending to ground level. Each foundation would require approximately 300 cubic yards of concrete. In the north portion of the project area, bedrock may be present within a few inches to 2 feet of the ground surface at some WTG locations. In these instances, a "Rock Anchor" type foundation could be required. In the Rock Anchor design, the rock would be removed to a depth of approximately 5 feet and a diameter of approximately 24 feet by mechanical removal methods and possibly engineered blasting.

In the southern portion of the project area, the tensionless tube foundation design may be utilized. With this foundation design, either by mechanical or explosive means, a 20-foot diameter by 30-foot-deep excavation is made, then two concentric corrugated metal pipes,
12 feet and 16 feet in diameter, are installed in the excavation. The inside of the smaller pipe and the outside of the larger pipe are then backfilled with the excavation materials. If the soils of the south area are not conducive to a tensionless tube foundation, the spread foundation design would be utilized in this area.

Grounding

To adequately ground the turbines to prevent damage from electrical storms, 3-inch-diameter, 30-foot-deep holes may be required for placement of turbine grounding rods as needed. These holes would be located adjacent to the turbine foundations within the 90-foot-diameter area to be

cleared for foundation construction. Following placement of the grounding rods, the holes would be backfilled and capped with concrete.

Tower Erection

Tower erection would require the use of one large track-mounted crane and two small-wheeled cranes. Two smaller wheeled cranes would be used to off-load turbine components from trucks, and to assist in the precise alignment of tower sections. The smaller crane would be used first to raise and install the two bottom tower sections, and then used to lower it over the threaded foundation bolts. The large crane would then raise the upper mid- and upper-tower section to be bolted through the attached flanges to the lower tower section, and to raise the nacelle, rotor hub, and blades to be installed atop the towers.

Underground Communication and Electrical Cables

Trenching equipment would be used to excavate trenches within or near the access road bed to bury the insulated underground cables that would connect each turbine transformer to one of the two project substations. Trenches for the large conductor cable would be approximately 42 inches deep, and backfilled with engineered trench material to protect the cables from damage or possible contact. Optical fiber communication links would be placed in the same trenches as the conductor cables. The depth, number of trenches, and backfill requirements would be determined by the size of the cable required and the thermal conductivity of the soil or rock surrounding the trench.

Transmission Line Construction

Overhead 230-kV transmission lines construction would use standard industry procedures including surveying, ROW preparation, materials hauling, structure assembly and erection, ground wire, conductor stringing, cleanup, and restoration. All transmission lines and structures would be designed to prevent the perching of birds. Construction procedures described below would be the same for the proposed 6.1-mile transmission line between the on-site substations and the 2.6-mile transmission line connecting to the WAPA proposed switching station.

Overhead 230-kV transmission interconnect lines would be constructed on monopole structures. The monopole structures typically would be set in auger holes approximately 3.6 feet in diameter and about 10 feet deep; if consolidated rock is encountered structure, holes would be advanced using mechanical removal methods and possibly engineered blasting. All blasting would be conducted by a permitted contractor, and would be in compliance with State and Federal regulations. Structures would be assembled on site. Structure erection and conductor stringing would occur sequentially along the ROW.

Existing public and private roads would be used to transport materials and equipment from laydown areas to ingress points along the proposed transmission line ROW using the shortest distance possible. The ROW would be used to access transmission line construction sites. The transmission lines would require the installation of temporary access routes. The access routes would be 12 feet wide, and cleared of large boulders to allow high-clearance, four-wheel-drive

vehicles to pass. The routes would be installed to allow access to support the construction of the transmission lines. Clearing of vegetation and minor grading may be necessary at some of the transmission line structures to facilitate their construction. Once construction is complete, some access routes would be used approximately twice a year for inspection and maintenance. Native vegetation would be allowed to re-establish over the routes to the extent that four-wheel-drive vehicle travel remains practical.

Temporary Concrete Batch Plant

The proposed project would require more than 40,000 cubic yards of concrete for construction of the wind tower foundations, substations, and O&M facility. Depending upon weather conditions, concrete typically needs to be poured within 90 minutes of its mixing with water. Delivery time to pour locations would likely exceed 90 minutes from existing concrete suppliers in the vicinity of the proposed project area. Therefore, a temporary, mobile concrete batch plant would be located within the laydown areas to facilitate the sub-90 minute delivery time needed. If concrete is mixed at the mobile batch plant, as opposed to existing concrete suppliers, cement, water, and aggregate would be staged in the laydown areas.

The batch plant would operate during project construction hours for approximately 4 to 5 months of the anticipated 8-month construction period. To construct the mobile batch plant, vegetation would be cleared and the ground leveled. For the containment of process water, a 1-foot-high earth berm or other appropriate erosion control device, such as silt fences and straw bales, would be installed around the area. Diversion ditches would be installed as necessary to prevent storm-water from surrounding areas running onto the site.

The batch plant would require a stand-alone, diesel-powered 250-kW generator. The generator would draw diesel fuel from an approximately 500-gallon aboveground storage tank with secondary storage for spill prevention. It is estimated that the batch plant would consume 2,000 to 4,000 gallons of water per day. An onsite 4,000-gallon water tank would be replenished as needed. The batch plant operation would be permitted by the Nevada Division of Environmental Protection.

Stockpiles of sand and aggregate would be located at the batch plant in a manner that would minimize exposure to wind. Cement would be discharged via screw conveyor directly from an elevated storage silo without outdoor storage. Cement trucks would be cleaned and washed at the batch plant. Cement residue would be washed from the cement delivery trucks into an aboveground lined and bermed settling pond. Cement residue would be collected from the settling pond and trucked off site for disposal, as needed.

Following completion of construction activities requiring cement, the batch plant would be demobilized, and the batch plant area would be restored. The area would be recontoured, stockpiled topsoil would be replaced, and the area would be restored according to the Reclamation, Restoration, and Revegetation Plan.

Portable Rock Crusher

To construct the proposed project's roads, a rock crusher would be required to provide appropriately-sized aggregate for fill and road base. The rock crusher would have an average capacity that could be more than 30,000 tons per day. The crusher would be located within the laydown areas and operated during project construction hours for approximately 4 to 5 months of the anticipated 8-month construction period. In accordance with BMPs, the rock crushing area would be sprayed by a water truck to suppress dust. The crusher contains several dust-suppression features including: built-in dust control measures on the crusher, including screens and water sprayers that would be operated at all emission points during crusher operation, including startup and shut down periods, as required by the Clark County Department of Air Quality and Environmental Management.

Water Use

During construction, water would be needed for dust control, making concrete, and equipment washing. All needed water would be transported from an off-site municipal or private source. No wells would be drilled or springs developed for the proposed project.

Post-Construction Clean Up

Final clean up and restoration of the proposed project area would occur immediately following construction. Waste materials would be removed from the area and recycled or disposed of at appropriate facilities. All construction-related waste would be properly handled in accordance with county, State, and Federal regulations and permit requirements. This waste may include vegetation, trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials. Excess material, such as soil and rocks excavated during the construction of the project, would be stockpiled at a location on site and made available as a saleable material.

Construction Work Force

A peak of approximately 250 to 300 workers per day would be required for construction of the proposed project. The beginning and end of the construction period would involve a slightly lower number of workers than required during the middle months. Construction of the proposed project would be completed over an approximate 8-month period.

Operation and Maintenance

Following installation and startup, routine maintenance of the turbines would be necessary to maximize performance and detect potential difficulties. Routine activities primarily would consist of daily visits by maintenance workers that would test and maintain the wind facilities. A standard planned maintenance schedule on each turbine is twice a year; once at the 6-month point and once at the 12-month point. The 6-month maintenance takes about 8 hours (1 day) and the 12-month maintenance takes about 16 hours (2 days). Based on this schedule, technicians work on only one turbine a day. If multiple turbines require simultaneous maintenance, an effort would be made to select neighboring turbines. The only other visits to a turbine would be in the event of an unplanned fault. Staff would travel in pick-ups or other light-duty trucks. Most

servicing and repair would be performed within the nacelle, without using a crane to remove the turbine from the tower. Rarely, the use of a crane or equipment transport vehicles may be necessary for cleaning, repairing, adjusting, or replacing the rotors or other components of the turbine.

Monitoring the operations of the SWEF would be conducted from computers located in the base of each turbine tower and from the O&M building using telecommunication links and computer-based monitoring.

Over time it would be necessary to clean or repaint the blades and towers, and periodically exchange lubricants and hydraulic fluids in the mechanisms of the turbines. All lubricants and hydraulic fluids would be stored, used, and disposed of in accordance with applicable laws and regulations. Any necessary repainting would be performed by licensed contractors in compliance with applicable laws and regulations.

The turbine gearboxes would be sealed to prevent lubricant leakage. The gearbox lubricant would be sampled periodically and tested to confirm that it retains adequate lubricating properties. When the lubricants have degraded to the point where they no longer contain the needed lubricating properties, the gearbox would be drained and new lubricant would be added. Transformers contain oil for heat dissipation, and are sealed and contain no moving parts. The transformer oil would be subject to periodic inspection but should not need replacement. Construction equipment and O&M vehicles would be properly maintained at all times to prevent leaks of motor oils, hydraulic fluids, and fuels. During operations, O&M vehicles would be serviced and fueled at the O&M building or at an off-site location. A Spill Prevention, Containment, and Countermeasures Plan would be prepared and include information regarding training, equipment inspection and maintenance, and refueling for construction vehicles, with an emphasis on preventing spills.

The proposed action would produce nonhazardous waste during O&M activities, which may include rags, broken or used metal machine and/or electrical parts, empty containers, typical refuse generated by employees in the field and office, and miscellaneous solid wastes. This waste would be properly disposed of at an approved landfill accepting Class I Municipal Solid Waste and/or Class III Industrial Waste within Clark County, Nevada.

Reclamation

Reclamation refers to the restoration of lands used temporarily during a construction activity (such as laydown areas) to their approximate condition prior to construction. After construction is complete, temporary work areas, trenches, and tower pads would be graded to the approximate original topographic contours, and the areas would be re-vegetated with a BLM-approved mixture of native grass, forbs, and shrub species. Reclamation would include implementation of all applicable BLM BMPs (Appendix B of Tetra Tech 2012).

WAPA's Interconnection Switching Station

WAPA proposes to construct, own, and operate a new switching station to interconnect the proposed project with WAPA's transmission system. It is anticipated that the switching station would become a permanent part of the WAPA transmission system. The proposed switching station would be located just west of WAPA's existing Davis-Mead 230-kV transmission line, approximately 7.5 miles east of the town of Searchlight, north of Cottonwood Cove Road (Figure 1). Access to the proposed switching station would be along the existing Davis-Mead transmission line road, entering from Cottonwood Cove Road. The switching station is located in the Paiute-Eldorado Critical Habitat Unit (PECHU) for Mojave desert tortoise. The transmission line road would require improvement for approximately 0.5 mile to be suitable for traffic to the site by construction vehicles, equipment delivery, and WAPA construction and maintenance personnel.

Facilities would include a control building, microwave tower, take-off structures and other steel support structures, buswork, and electrical and control equipment for switching, protection, metering, safety, and O&M purposes. The switching station would occupy approximately 3.5 acres, with an additional 2.5 acres outside the security fence required for site preparation, drainage, and road access. An 8-foot-tall chain-link fence topped with razor wire would provide security for the switching station. Adequate space would be provided inside the fence to maneuver construction and maintenance vehicles. Additionally, the facility would be sized to accommodate additional bays for future interconnections.

The terrain at the proposed location of the switching station features rolling hills and dry washes. Substantial civil design and earth moving would be required to level the station yard and provide for site drainage and roads, including excavation, grading, and other site improvements to accommodate the required electrical equipment. Construction would be performed by a WAPA-managed contractor in accordance with WAPA's standard environmental protection provisions (Appendix C of Tetra Tech 2012) and safety standards. A representative from WAPA would be present at all times while a contractor was working on site.

Three power circuit breakers would be installed at the switching station to facilitate two interconnections for the existing transmission line and one for the proposed wind energy facility line. These breakers would be used to automatically interrupt power flow in the event of an electrical fault. Gas breakers planned for the proposed switching station would be insulated by special non-conducting gas (sulfur hexafluoride [SF_6]). During normal operation of the new switching station, authorized WAPA personnel would conduct periodic inspections and service equipment as needed. WAPA would monitor and manage the use, storage, and replacement of SF_6 to minimize any releases to the environment. Gas used in switching station circuit breakers is contained in sealed units that are factory-certified to not leak; equipment would be monitored nonetheless. Seven disconnect switches used to mechanically disconnect or isolate equipment would be installed. A 3-inch deep layer of gravel surfacing selected for its insulating properties

would be placed on the ground within the substation to protect O&M personnel from electrical danger in the event of electrical faults.

Power would move within the substation and between breakers and other equipment on bus tubing (smooth aluminum pipe less than 6 inches in diameter). Bus tubing would be elevated by supports called bus supports. Buswork within the proposed switching station would route the wind energy facility's output to the Davis-Mead transmission line. The buswork would be approximately 30 feet high.

Electric/electronic controls and monitoring equipment for the power system would be housed in a building approximately 30 feet by 60 feet within the switching station. The control building would be environmentally controlled to provide a suitable environment for the equipment housed there. Station service power would be supplied by a tap on an adjacent local utility distribution line and/or from a 230-kV power voltage transformer within the switching station. A new distribution line on single wood-pole (monopoles) structures about 1,000 feet long would be constructed between the switching station to the existing distribution line. The primary station service source would be determined during the design phase for the switching station.

WAPA's Transmission Interconnection

WAPA proposes to install two new transmission line structures to tie in the new switching station with the Davis-Mead 230-kV transmission line. Each turning structure would be a steel monopole structure, self-supporting with no down-guys. These structures would provide for turning the line into the station at angles of 90 degrees Fahrenheit (°F) or more to line up and connect with the take-off structures within the proposed switching station. It is envisioned that the new structures would be located within the existing Davis-Mead transmission line ROW in the span between the two existing structures east of the proposed switching station.

A temporary line might be built in order to keep the Davis-Mead transmission line operational while the bulk of the switching station construction is being completed. When the new switching station is complete and ready for energization, the existing Davis-Mead transmission line conductors in the span east of the station would be cut and attached to the new turning structures. New conductors would be installed from the new turning structures to the steel take-off structures within the switching station.

Conservation Measures

BLM and the Applicant have proposed the following measures to minimize negative project impacts to desert tortoises. The project is designed to minimize ground disturbance wherever practicable.

1. *Waste Management Plan.* The Applicant will prepare a Waste Management Plan, in accordance with applicable laws and regulations, which will describe the storage,

transportation, and handling of hazardous materials and wastes; will emphasize the recycling of wastes, where possible; and will identify the specific landfills that will receive wastes that cannot be recycled.

2. *Weed Management Plan.* An Invasive Plant Management Plan will be developed for construction and O&M activities and include results of noxious weed inventories, identification of problem areas, preventative measures, treatment methods, agency-specific requirements, monitoring requirements, and herbicide treatment protocol.

3. *Site Rehabilitation and Facility Decommissioning Plan.* The applicant will develop a Reclamation, Restoration, and Revegetation Plan in consultation with appropriate agencies prior to adoption of the Final Environmental Impact Statement that will guide restoration and revegetation activities for all disturbed lands associated with construction of the project and the eventual termination and decommissioning of the project.

4. *Water Usage.* If water is used for fugitive dust control, it will not be allowed to pool on access roads or other project areas, as this can attract desert tortoises. Similarly, leaks on water trucks and water tanks will be repaired to prevent pooling water.

5. *Minimize Overhead Collection Line.* Collection lines will be buried to the greatest extent feasible to reduce the opportunity for perches for raptors and ravens.

6. *Reduce Night Lighting.* Night lighting will be reduced in all natural areas to avoid unnecessary visual disturbance to wildlife using directed lighting, shielding methods, and/or reduced lumen intensity except as required by regulatory agencies such as the Federal Aviation Administration.

7. *Clean up.* SWEF will ensure that all unused material and equipment will be removed upon completion of construction activities or maintenance activities conducted. Upon completion, all construction equipment and refuse, including, but not limited to wrapping material, cables, cords, wire, boxes, rope, broken equipment parts, twine, strapping, buckets, metal or plastic containers will be removed from the site and disposed of properly. Any unused or leftover hazardous products will be properly disposed of offsite.

8. *Desert Tortoise Fencing.* Desert tortoise fencing will be installed around permanent facility structures including the O&M building and WAPA's proposed switching station.

9. *Desert Tortoise Measures.* The applicant or a qualified consultant will provide for the following to reduce impacts to desert tortoise:

a. A compliance manager will be designated and will oversee compliance monitoring activities and coordination with authorizing agency(s). Compliance activities will at a minimum include conducting preconstruction surveys, assuring proper handling of desert tortoise, adequate staffing of biological monitors during construction, and upholding all authorized conditions. The compliance manager will oversee all compliance documentation including daily observation reports, non-compliance and corrective action reports, and final reporting to any authorized agency upon project completion.

b. Construction monitoring will employ a designated compliance inspection contractor and authorized desert tortoise biologist(s) during the construction phase. A qualified biologist is defined as a person with appropriate education, training, and experience to conduct tortoise surveys, monitor project activities, provide worker education programs, and supervise or perform other implementing actions. An authorized desert tortoise biologist is defined as a wildlife biologist who has been approved to handle desert tortoises by the Service. A minimum of one monitor per crew is needed for construction crews using heavy equipment (e.g., backhoes, large trucks). One roving monitor will monitor multiple times per day in other active construction zones where heavy equipment is not in use.

c. All work area boundaries associated with temporary and permanent disturbances will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers will strictly limit activities and vehicles to the designated work areas.

d. Crushing or removal of perennial vegetation in work areas will be avoided to the maximum extent practicable.

e. Trash and food items will be contained in closed lid (raven- and coyote-proof) containers. Trash will be removed regularly (at least once a week) to reduce the attractiveness to the site to opportunistic tortoise predators such as common ravens and coyotes and to reduce the possibility of animals ingesting or becoming entangled in foreign matter.

f. Pets will not be allowed in working areas unless restrained in a kennel.

g. Where possible, motor vehicles will be limited to maintained roads and designated routes.

h. Desert tortoise caution signs will be installed on turbine access roads.

i. Desert tortoise clearance surveys at the project site must consist of at least two consecutive surveys of the site. Surveys shall involve walking transects less than

or equal to 15-feet (5-meter) wide under typical conditions. In areas of dense vegetation or when conditions limit the ability of the surveyors to locate desert tortoises, transects should be reduced in width accordingly. Clearance surveys should be conducted when desert tortoises are most active (April through May or September through October). If desert tortoises are observed during the second pass, the Service and the appropriate State wildlife agency may require a third survey.

j. All methods used for handling desert tortoises during the clearance surveys must be in accordance with the Desert Tortoise Field Manual (Service 2009). Anyone that handles desert tortoises during clearance activities must have the appropriate authorizations from the Service and the State.

k. During the clearance surveys, desert tortoises in burrows may be removed through tapping or careful excavation. Multiple visits may be necessary if desert tortoises are inaccessible in deep caves or burrows. During all handling procedures, desert tortoises shall be treated in a manner to ensure that they do not overheat or exhibit signs of overheating (e.g., gaping, foaming at the mouth, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert tortoises shall be kept shaded at all times until it is safe to release them. Ambient air temperature shall be measured in the shade, protected from wind, at a height of 2 inches (5 centimeters) above the ground surface. All clearance activities (capture, transport, release, etc.) shall occur when ambient temperatures are below 95°F (35°C) and not anticipated to rise above 95°F (35°C) before handling and processing desert tortoises are completed.

l. For desert tortoises that need to be relocated out of harm's way, the tortoise should be placed out of the path of project activity as per the instructions and guidance from the authorized desert tortoise biologist.

m. The area cleared and number of desert tortoises located within that area must be reported to the local Service and the appropriate State wildlife agency. The report should be made in writing, either by mail or email. Notification should be received within one week.

n. For activities conducted between March 15 and November 1 in desert tortoise habitat, all activities in which encounters with tortoises might occur will be monitored by an authorized desert tortoise biologist. The biologist will be informed of tortoises relocated during preconstruction surveys so that he or she could watch for the relocated tortoises in case they attempted to return to the construction site. The authorized desert tortoise biologist will watch for tortoises wandering into the construction areas, check under vehicles, examine excavations and other potential pitfalls for entrapped animals, examine exclusion fencing, and

conduct other activities to ensure that death or injuries of tortoises were minimized.

o. For open trenches, earthen escape ramps will be maintained at intervals of no greater than 0.25 mile. A biological monitor will inspect all trenches, auger holes, or other excavations a minimum of twice per day, and also immediately prior to back-filling. Any wildlife species located will be safely removed and relocated out of harm's way, using a suitable tool such as a pool net when applicable. For safety reasons, biological monitors will under no circumstance enter open excavations.

p. No overnight hazards to desert tortoises (e.g., auger holes, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards will be eliminated each day prior to the work crew and biologist leaving the site. Plywood board will be used to cover open hazards. All excavations will be inspected for trapped desert tortoises at the beginning, middle, and end of the work day. Should a tortoise become entrapped, the authorized desert tortoise biologist will remove it immediately.

q. If blasting is required in desert tortoise habitat, a biological monitor will be assigned to each blasting crew or area in which blasting will occur. Prior to any blast, a 200-foot area around the blast site will be surveyed for desert tortoises. Aboveground tortoises will be relocated at least 500 feet from the blast site. Tortoises in burrows within 50 feet of the blast site will be relocated at least 75 feet away from the blast site to an unoccupied existing or artificial burrow. Burrows located between 50 and 150 feet away from the blast site will be flagged and stuffed with newspaper prior to the blast. The newspaper will be removed immediately after the blast and burrows assessed for damage.

r. Routine inspection and maintenance of transmission lines will be limited to the desert tortoise inactive periods of November through February and June through August. All access roads with re-established native vegetation that are used for scheduled, routine maintenance activities will be cleared by a tortoise monitor ahead of any vehicular movement. Should unscheduled, emergency maintenance become necessary, a tortoise monitor will clear the route ahead of vehicular movement.

s. Any incident occurring during project activities that was considered by the biological monitor to be in non-compliance with the mitigation plan will be documented immediately by the biological monitor. The compliance manager will ensure that appropriate corrective action was taken. Corrective actions will be documented by the monitor. The following incidents will require immediate cessation of the construction activities causing the incident, including 1) imminent

threat of injury or death to a desert tortoise; 2) unauthorized handling of a desert tortoise, regardless of intent; 3) operation of construction equipment or vehicles outside a project area cleared of desert tortoise, except on designated roads; and 4) conducting any construction activity without a biological monitor where one is required. If the monitor and compliance inspection manager do not agree, the BLM's compliance officer will be contacted for resolution. All parties would refer the resolution to the BLM's authorized officer.

t. *Worker Environmental Awareness Program.* A Worker Environmental Awareness Program (WEAP) will be prepared. Construction crews and contractors associated with the SWEF or the WAPA switching yard or power line will be required to participate in WEAP training prior to starting work on the project. This instruction will include specific desert tortoise training on distribution, general behavior and ecology, identification, protection measures, reporting requirements, and protections afforded by State and Federal endangered species acts.

u. Parked vehicles will be inspected prior to being moved. If a tortoise is observed beneath a vehicle, the authorized desert tortoise biologist will be contacted to move the animal from harm's way, or the vehicle will not be moved until the desert tortoise left of its own accord. The authorized desert tortoise biologist will be responsible for taking appropriate measures to ensure that any desert tortoise moved in this manner is not exposed to temperature extremes that could be harmful to the animal.

v. Should any desert tortoise be injured or killed, all activities will be halted, and the compliance inspection manager and/or authorized desert tortoise biologist immediately contacted. The compliance inspection manager and/or authorized desert tortoise biologist will be responsible for reporting the incident to the authorizing agencies.

w. A report to the Service will be produced reporting all tortoises seen, injured, killed, excavated, or handled. GPS locations of live tortoises will be reported.

x. The applicant will implement a Raven Management Program that will consist of: 1) an annual survey to identify raven nests on towers and any tortoise remains at tower locations; this information will be relayed to BLM so that the ravens and/or their nests in these towers would be targeted for removal, 2) SWEF making an annual or one time contribution to an overall raven reduction program in the Nevada desert, with an emphasis on raven removal in the vicinity of this project.

y. BLM will hold a preconstruction meeting with Duke Energy and the compliance inspection contractor (CIC) to discuss implementation of the terms and conditions of the biological opinion.

In addition, BLM proposes the additional measures described in detail below that include 1) a transportation plan to reduce potential mortality from vehicles during construction, restoration, and O&M and 2) the payment of remuneration fees to compensate for the loss of desert tortoise habitat from the SWEF (Appendix A).

10. *Transportation Plan.* The transportation plan will be implemented during construction, O&M, and reclamation. The year will be divided into three periods based on Mojave desert tortoise activity levels as follows:

    - High activity period – April 1 to May 31 and September 1 to October 31
    - Moderate activity period – March 1 to March 31 and June 1 to August 31
    - Low activity period – November 1 to February 28 or 29

    During the high activity periods, a speed limit of 15 miles per hour will be maintained on all roads related to access for construction, post-construction (i.e., operation), and restoration. One biological monitor will travel in front of each piece of construction, post-construction, and restoration equipment and other construction-related vehicles entering and exiting the construction areas. If possible, construction, post-construction, and restoration equipment will be grouped while being escorted by a biological monitor entering and exiting the construction areas. Vans, busses, or carpooling will be employed to reduce the number of worker-related vehicles within the construction, post-construction, and restoration areas. These vehicles will be grouped and escorted by a biological monitor entering and exiting the construction, post-construction, and restoration area.

    During the moderate activity period of March 1 to March 31, low activity measures (see below) will be in effect until the temperature exceeds 68°F for three consecutive days or a tortoise is observed. If a tortoise is observed or the temperature exceeds 68°F for three consecutive days, minimization measures for the high activity period will take effect unless the weather forecast for the next day is for the temperature to drop below 68°F.

    During the moderate activity period of June 1 to August 31, high activity measures will be in effect until the temperature exceeds 95°F. After the temperature exceeds 95°F, minimization measures for the low activity period will take effect.

    During the low activity periods, a speed limit of 20 miles per hour will be maintained on all roads related to access for construction, post-construction, and restoration. Construction, post-construction, and restoration equipment entering and exiting a construction site will not need to be escorted by a biological monitor. Vans, busses, or carpooling will be optional to reduce the number of worker-related vehicles within the construction, post-construction, and restoration areas. Vans, busses, or carpooling will

still be recommended to reduce the number of worker-related vehicles in construction areas.

11. *Remuneration Fees.* BLM will ensure payment by the project proponent of remuneration fees (see Tetra Tech 2012 for more details).

Remuneration fees would be used for management actions expected to promote recovery of the desert tortoise over time. Actions may involve habitat acquisition, population or habitat enhancement, increasing knowledge of the species' biological requirements, reducing loss of individual animals, documenting the species status and trend, and preserving distinct population attributes (Hastey et al. 1991, BLM 2010).

DESCRIPTION OF THE ACTION AREA

The action area is defined as all areas to be affected directly or indirectly by the Federal action, including interrelated and interdependent actions, and not merely the immediate area involved in the action (50 CFR § 402.02). Subsequent analyses of the environmental baseline, effects of the action, cumulative effects, and levels of incidental take are based upon the action area as determined by the Service. Regulations implementing the Act define the environmental baseline as the past and present effects of all Federal, State, or private actions and other human activities in the action area (50 CFR § 402.02). Also included in the environmental baseline are the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation, and the effects of State and private actions that are contemporaneous with the consultation in progress.

The action area for the SWEF project includes the turbine pads, new and upgraded roads and crane pads, O&M facility, the equipment storage and construction laydown areas, the overhead transmission line ROW, substations, batch plant, meteorological towers, and WAPA's switching station, which combined account for approximately 388.5 acres of surface disturbance (Figure 2). To address adverse effects to desert tortoises whose home ranges overlap all project features, the action area also includes a 0.5-mile buffer surrounding all project features and isolated islands of habitat surrounded by features that may not otherwise be within the 0.5-mile buffer, which accounts for approximately 21,750 acres (Figure 2).

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Jeopardy Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and

recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed Federal action, and any cumulative effects, on the rangewide survival and recovery of the desert tortoise. It relies on four components: 1) the Status of the Species, which describes the rangewide condition of the desert tortoise, the factors responsible for that condition, and its survival and recovery needs; 2) the Environmental Baseline, which analyzes the condition of the desert tortoise in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the desert tortoise; 3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the desert tortoise; and 4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the desert tortoise.

Adverse Modification Determination

Section 7(a)(2) of the Act also requires that Federal agencies ensure that any action they authorize, fund, or carry out does not result in the destruction or adverse modification of designated critical habitat. Our analysis of effects to desert tortoise designated critical habitat follows Service-issued guidance: *Application of the "Destruction or Adverse Modification" Standard under section 7(a)(2) of the Endangered Species Act* issued on December 9 2004. The guidance addresses the 9th Circuit Court of Appeals ruling in *Gifford Pinchot Task Force v U.S. Fish and Wildlife Service*, No. 03-35279 (August 6, 2004) and states that an evaluation of effects to designated critical habitat should consider the concepts embodied in the sections 3 (definitions of "critical habitat" and "conservation"), 4 (the procedures for delineating and adjusting areas included in a designation) and 7 (the substantive standard in paragraph (a)(2) and the procedures in paragraph (b)) and focus on the function and conservation role of both the affected critical habitat unit (CHU) as well as the entire designation.

The critical habitat within the action area includes undisturbed desert tortoise habitat, as well as degraded areas as a result of previous projects and activities. When critical habitat was designated in 1994, disturbances to desert tortoises and their habitat in the action area included off-road vehicle (ORV) activity, mining, transmission lines, and roads (Service 1994). Desert tortoise habitat conditions and disturbances in the action area are similar to those identified in 1994 and also include drought and fire (Service 2011). Desert tortoise critical habitat is composed of specific geographic areas that contain the primary constituent elements (PCEs) of critical habitat, consisting of the biological and physical attributes essential to the species' conservation within those areas. Undisturbed designated critical habitat in the action area retains the PCEs of critical habitat as discussed below.

PCE 1: Sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow. Urban and agricultural development, concentrated use by ORVs, and other activities of this nature completely remove habitat. Although we are aware of local areas within the boundaries of critical habitat that have been heavily disturbed by the unauthorized use of such activities, we do not know of any areas that have been disturbed to the intensity and extent that this PCE has been compromised. To date, the largest losses of critical habitat are likely the result of the widening of existing freeways. Despite these losses of critical habitat, which occur in a linear manner, the CHUs continue to support sufficient space to support viable populations within each of the five recovery units.

In some cases, major roads likely disrupt the movement, dispersal, and gene flow of desert tortoises. Highways 58 and 395 in the Fremont-Kramer CHU; U.S Highway 95 in the PECHU; and Fort Irwin Road in the Superior-Cronese CHU are examples of large and heavily traveled roads that likely disrupt movement, dispersal, and gene flow. Roads that have been fenced and provided with underpasses may alleviate this fragmentation to some degree; however, such facilities have not been in place for sufficient time to determine whether they would eliminate this effect.

The threats of invasive plant species described in the revised recovery plan generally do not result in the removal of this PCE because they do not convert habitat into impervious surfaces, such as urban development would.

PCE 2: Sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species. This PCE addresses the ability of critical habitat to provide adequate nutrition to desert tortoises. As described in the revised recovery plan and 5-year review, grazing, historical fire, invasive plants, altered hydrology, drought, wildfire potential, fugitive dust, and climate change/temperature extremes contribute to the stress of "nutritional compromise." Paved and unpaved roads through critical habitat of the desert tortoise provide avenues by which invasive native species disperse; these legal routes also provide the means by which unauthorized use occurs over large areas of critical habitat. Nitrogen deposition from atmospheric pollution likely occurs throughout the entire CHUs and exacerbates the effects of the disturbance of substrates. Because paved and unpaved roads are so widespread through critical habitat, we expect that this threat has, to some degree, compromised the conservation value and function of critical habitat throughout the range of the desert tortoise.

PCE 3: Suitable substrates for burrowing, nesting, and overwintering. Surface disturbance, motor vehicles traveling off route, use of off-highway vehicle management areas, off-highway vehicle events, unpaved roads, grazing, historical fire, wildfire potential, altered hydrology, and climate change leading to shifts in habitat composition and location, storms, and flooding can alter substrates to the extent that they are no longer suitable for burrowing, nesting, and overwintering; erosion caused by these activities can alter washes to the extent that desert tortoise burrows placed along the edge of a wash, which is a preferred location for burrows, could be destroyed. We expect that the area within critical habitat that is affected by ORV use to

the extent that substrates are no longer suitable is relatively small in relation to the area that desert tortoises have available for burrowing, nesting, and overwintering; consequently, we expect that ORV use does not have a substantial effect on this PCE.

Most livestock allotments have been eliminated from within the boundaries of critical habitat. Additionally, we expect that livestock would compact substrates to the extent that they would become unsuitable for burrowing, nesting, and overwintering only in areas of concentrated use, such as around watering areas and corrals. Because livestock grazing occurs over a relatively small portion of critical habitat and the substrates in most areas within livestock allotments would not be substantially affected, we expect that suitable substrates for burrowing, nesting, and overwintering remain throughout most of the CHUs.

PCE 4: Burrows, caliche caves, and other shelter sites. We expect that human-caused effects to burrows, caliche caves, and other shelter sites likely occur at a similar rate as effects to substrates for burrowing, nesting, and overwintering for the same general reasons. Consequently, we expect that sufficient burrows, caliche caves, and other shelter sites remain throughout most of the CHUs.

PCE 5: Sufficient vegetation for shelter from temperature extremes and predators. In general, sufficient vegetation for shelter from temperature extremes and predators remains throughout critical habitat. In areas where large fires have occurred in critical habitat, many of the shrubs that provide shelter from temperature extremes and predators have been destroyed; in such areas, cover sites may be a limiting factor. The proliferation of invasive plants poses a threat to shrub cover throughout critical habitat as the potential for larger wildfires increases.

In 2005, wildfires in Nevada, Utah, and Arizona burned extensive areas of critical habitat. The revised recovery plan notes that the fires caused statistically significant losses of perennial plant cover, although patches of unburned shrubs remained. Given the patchiness with which the PCEs of critical habitat are distributed across the CHUs and the varying intensity of the wildfires, we cannot quantify precisely the extent to which these fires disrupted the function and value of the critical habitat.

PCE 6: Habitat protected from disturbance and human-caused mortality. In general, the Federal agencies that manage lands within the boundaries of critical habitat have adopted land management plans that include implementation of some or all of the recommendations contained in the original recovery plan for the desert tortoise. To at least some degree, the adoption of these plans has resulted in the implementation of management actions that are likely to reduce the disturbance and human-caused mortality of desert tortoises. For example, these plans resulted in the designation of open routes of travel and the legal closure (and, in some cases, physical closure) of unauthorized routes. Numerous livestock allotments have been relinquished by the permittees and retired by BLM and the National Park Service. As a result of planning efforts, BLM's record of decision included direction to withdraw areas of critical habitat from mineral entry. As a result of actions on the part of various agencies, many miles of highways and

other paved roads have been fenced to prevent desert tortoises from wandering into traffic and being killed. The Service and other agencies of the Desert Managers Group in California are implementing a plan to remove common ravens that prey on desert tortoises and to undertake other actions that would reduce subsidies (i.e., food, water, sites for nesting, roosting, and perching, etc.) that facilitate their abundance in the California desert.

Despite the implementation of these actions, disturbance and human-caused mortality continue to occur in many areas of critical habitat (which overlap the desert wildlife management areas to a large degree and are the management units for which most data are collected) to the extent that the conservation value and function of critical habitat is, to some degree, compromised. For example, many highways and other paved roads in California remain unfenced. Twelve desert tortoises were reported to be killed on paved roads from within Mojave National Preserve in 2011; we fully expect that desert tortoises are being killed at similar rates on many other roads, although these occurrences are not discovered and reported as diligently as by the National Park Service.

Unauthorized ORV use continues to disturb habitat and result in cleared areas within the boundaries of critical habitat in California (e.g., Coolgardie Mesa in the Western Mojave Recovery Unit); although we have not documented the death of desert tortoises as a result of this activity, it likely occurs. Additionally, the habitat disturbance caused by this illegal activity exacerbates the spread of invasive plants, which displace native plants that are important forage for the desert tortoise, thereby increasing the physiological stress faced by desert tortoises.

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

The rangewide status of the desert tortoise and its critical habitat consists of information on its listing history, species account, recovery plan, recovery and CHUs, distribution, reproduction, and numbers. This information is dated February 9, 2012, and provided on the Service's website at: http://www.fws.gov/nevada/desert_tortoise/dt_life.html. If unavailable on this website, contact the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230, and provide File No. 84320-2012-F-0211 along with the date of February 9, 2012. Additional information is provided in our 5-year review (Service 2010a) and revised recovery plan for the Mojave desert tortoise (Service 2011).

ENVIRONMENTAL BASELINE

Status of the Desert Tortoise in the Action Area

The project is located on the boundary between the Eastern Mojave and Colorado Desert Recovery Units for desert tortoise. The vegetation present in the action area is characteristic of the Mojave Desert Scrub biome and is comprised of creosote bush (*Larrea tridentata)*, Joshua tree (*Yucca brevifolia*), Mojave yucca (*Yucca schidigera*), white bursage (*Ambrosia dumosa*), and several species of cholla cactus (*Opuntia* spp.). A number of other shrub and annual plant

species are generally also present. The elevation ranges from 2,240 to 4,327 feet above mean sea level. The northern portion of the project area is characterized by a higher variation in both topography and vegetation including Joshua tree woodlands when compared to the WAPA portion, which is flat, primarily in the valley floor and contains a more uniform, creosote bush-dominated habitat. The action area is situated along a bajada (alluvial fan) which extends north, south, and east from the town of Searchlight. According to GAP analysis, six GAP vegetative communities exist within the project area: Sonoran-Mojave Creosote bush-White Bursage Desert Scrub, Mojave Mid-Elevation Mixed Desert Scrub, North American Warm Desert Wash, North American Warm Desert Bedrock Cliff and Outcrop, Sonora-Mojave Mixed Salt Desert Scrub, and Intermountain Basins Semi-Desert Shrub Steppe (see Figure 2 in Tetra Tech 2012). Soil largely consists of sandy, stony loam with abundant rock/boulder deposition and dry washes exist throughout the project area. The weather at the project area is characterized by extreme temperatures and dry conditions; the area receives approximately 7 inches of precipitation annually.

Desert tortoise surveys were conducted in accordance with Service protocol (Service 2010) by qualified field biologists from April 4 to May 16, 2011. This survey time encompassed the desert tortoise active season of April to May; a timeframe selected to minimize the probability of the temperature rising above 40 °C which serves as a temperature threshold for desert tortoise activity (Zimmerman et al. 1994; Freilich et al. 2000; Nussear et al. 2007). All survey methods were reviewed and agreed to by BLM and the Service prior to conducting surveys.

A 200-foot buffer was placed around all approximately mapped final locations of project features (survey boundary in Figure 3), and desert tortoise surveys were conducted within this buffer. This survey area is a smaller part of the Action Area (Figures 2 and 3). In some areas, intersecting facilities created isolated islands of habitat that were not included in a survey corridor. Per discussions with BLM, these islands were included in the survey area in order to best assess desert tortoise density and assess project impacts. Therefore, the survey area totaled 3,612 acres (600-foot exterior belt transect in Figure 3). The survey area is within the known range of the desert tortoise (Service 2010b). Although the 3,612 acre (14.6 km^2) survey area is above the 4.5 km^2 threshold needed for probabilistic sampling (Table 2 of Service 2010b), the linear features of the project required 100 percent coverage methods for the pre-construction survey. Therefore, 100 percent coverage surveys were completed throughout the entirety of the described survey area.

A total of 122 live desert tortoises were located within the survey area. Ninety-five occurred within the main survey boundary, 19 occurred along the exterior belt transects, and 8 occurred incidentally outside of the survey area (Figure 3). However, the Service takes into account only adult tortoises above 160 millimeters midline carapace length for abundance estimates (Service 2010b). Of the 122 live tortoise detected, 60 met this requirement. Using the "number of tortoises observed within the action area equation" (Table 3 of Service 2010b) and average monthly precipitation from the winter (October through March) preceding the surveys averaged

37 millimeters (1.463 inches) per month, 150 tortoises are estimated to occur within the 3,612 acre survey area.

Other observed and documented desert tortoise sign included 240 pieces of scat, 95 carcasses, 750 tortoise burrows, and 22 pieces of miscellaneous sign (1 courtship ring, 2 egg shell fragments, 19 bone/scute fragments; Table 1).

Table 1. Summary of Live Desert Tortoise and Desert Tortoise Sign Detected within the Action Area

	Area Surveyed	
Detection Type	Action Area	Exterior Belt Transect
Live Desert Tortoise	95	19
Burrows	650	100
Carcasses	74	21
Scat	220	20

Based on the 150 tortoises estimated from the 2011 surveys, an approximate desert tortoise density for the proposed action was calculated using the tortoise density calculator (Service 2010b). As the survey methods covered 100 percent of the survey area, the total area used for density calculations was 3,612 acres (14.6 km^2). The tortoise density, then, was calculated to be approximately 0.04 tortoises per acre or 10.2 tortoises per km^2. Because similar quality habitat occurs in the area surrounding the survey area, we assume a similar density of tortoises is present throughout the Action Area.

The majority of tortoises and sign were observed in the lower elevation, creosote scrub flats of the northern and southern survey area (Figure 3 and 4). These sections consist of substrate suitable for burrow construction and numerous washes, as well as abundant preferred food sources of the desert tortoise (e.g., globe mallow and desert marigold). Such characteristics of suitable substrate and quality food source provide higher quality habitat thus increasing the potential for encountering tortoise in the lower elevation flats represented in the northern and southern sections.

The higher elevation areas within the action area are much rockier, with steeper slopes and less abundant food sources. Although still considered suitable desert tortoise habitat, these characteristics are less favorable to desert tortoise thus reducing the potential for desert tortoise encounters in those portions of the project containing this type of habitat. Although survey results demonstrate desert tortoise are more widely distributed in the lower elevation flats of the project area, a large amount of sign was observed and documented in these higher elevation areas (Figure 4).

We recognize that the survey data used for these estimates represents a single point in time and the number of individuals in these areas can change in response to environmental conditions. Efforts to accurately estimate the number of desert tortoises that may be encountered on linear projects such as the SWEF are difficult. Variables that affect the number of tortoises occurring

or entering the action area include habitat quality, season, temperature, and precipitation. All desert tortoises may not have been detected during the survey; some desert tortoises may die or may leave the project area before construction commences; other unaccounted desert tortoises may move onto the site before construction begins; and undetected hatchling desert tortoises may emerge from rodent burrows or nests on, or adjacent to the ROW. However, the information above provides the best available data to establish a baseline for analysis.

Status of the Critical Habitat in the Action Area

The vegetation present in critical habitat within the undisturbed action area is characteristic of the Mojave Desert Scrub biome and is comprised of creosote bush (*Larrea tridentata)*, Joshua tree (*Yucca brevifolia*), Mojave yucca (*Yucca schidigera*), white bursage (*Ambrosia dumosa*), and several species of cholla cactus (*Opuntia* spp.). A number of other shrub and annual plant species are generally also present. The elevation ranges from 2,240 to 4,327 feet above mean sea level. A small amount of the proposed project occurs in the PECHU (Figure 5), which totals 516,655 acres. As a result of the proposed project, 7 acres of critical habitat, where the WAPA transmission line would be constructed, would be disturbed. This accounts for a statistically insignificant amount of habitat disturbance in the PECHU.

Factors Affecting the Species and its Critical Habitat in the Action Area

Currently, there are three sites in the testing phase for wind energy development on BLM-managed lands within a 20 mile radius of the SWEF. One other site on BLM-managed lands approximately 35 miles northwest of the project is pending authorization for development of a wind energy facility. Two solar energy facilities on privately-owned lands occur approximately 20 miles north of the SWEF. Additionally, several competitive ORV races occur in the Laughlin and Searchlight areas. The Hare Scrambles Championship Team Race is a 37-mile course with a start and finish point located approximately 10 miles west of Laughlin off of SR 163. DNF Racing's SNORE-Laughlin Rage at the River is another competitive ORV race held in the Laughlin area over an 11.8-mile race course. SCORE's Laughlin desert challenge truck and buggy race is a 3-day event held every January on an approximately 6.5-mile designated loop course near Laughlin. The Searchlight Grand Prix is a motorized event held every year during a weekend in November on an approximately 10-mile designated loop that includes both private streets in Searchlight as well as BLM-designated routes through desert tortoise habitat.

Section 7 Consultations Affecting the Proposed Project Area

The following consultations address areas that overlap the action area addressed in this biological opinion.

On November 25, 1997, the Service issued a Programmatic Biological Opinion (PBO) (File No. 1-5-97-F-251) to BLM for implementation of various land management programs within the Las Vegas District planning area excluding desert tortoise critical habitat and ACECs, and outside the

Las Vegas Valley. Activities proposed that may affect the desert tortoise in the action area include issuance of ROW, Recreation and Public Purposes leases, mineral material sales and leases, and mining plans of operation. The PBO is limited to activities which may affect up to 240 acres per project, and a cumulative total of 10,000 acres excluding land exchanges and sales. Only land disposals by sale or exchange in Clark County (but outside the Las Vegas Valley) are covered under the consultation up to a cumulative total of 14,637 acres. Thus, a maximum total of 24,637 acres of desert tortoise habitat may be affected by the proposed programmatic activities.

On June 18, 1998, the Service issued a PBO (File No. 1-5-98-F-053) to BLM for implementation of various land management programs within desert tortoise habitat and the Las Vegas planning area, including desert tortoise critical habitat and ACECs. Activities that were proposed that may affect the desert tortoise in the action area include recreation; designation of utility corridors and mineral material extraction areas and designation of the Piute-Eldorado ACEC.

Habitat Conservation Plans

Since the Mojave population of the desert tortoise was first listed under the Act in 1989, three regional-level habitat conservation plans (HCPs) have been implemented for development of desert tortoise habitat in Clark County, Nevada. Approximately 89 percent of Clark County consisted of public lands administered by the Federal government, thereby providing little opportunity for mitigation for the loss of desert tortoise habitat under an HCP on non-Federal lands. Alternatively, funds are collected under HCPs and spent to implement conservation and recovery actions on Federal lands as mitigation for impacts that occur on non-Federal lands. Lands managed by BLM are included in these areas where mitigation funds are used to promote recovery of the desert tortoise. Actions taken in relation to the HCPs mentioned here are/were taken in areas that overlap the action area addressed in this biological opinion.

On November 22, 2000, the Service issued an incidental take permit (TE-034927) to Clark County, Nevada, including cities within the County and Nevada Department of Transportation (NDOT). This HCP is the only regional HCP in place that overlaps the action area. The incidental take permit allows incidental take of desert tortoises for a period of 30 years on 145,000 acres of non-Federal land in Clark County, and within NDOT ROWs, south of the 38th parallel in Nevada. The multiple species habitat conservation plan (MSHCP) and Environmental Impact Statement (RECON 2000), serves as the permittees' HCP and details their proposed measures to minimize, mitigate, and monitor the effects of covered activities.

EFFECTS OF THE PROPOSED ACTION ON THE DESERT TORTOISE AND ITS DESIGNATED CRITICAL HABITAT

Project Effects on Desert Tortoise

Direct effects are the immediate, often obvious effect of the proposed action on the desert tortoise or its designated critical habitat. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur (50 CFR § 402.02). In contrast to direct effects, indirect effects can be more subtle, and may affect desert tortoise populations and habitat quality over an extended period of time, long after project activities have been completed. Indirect effects are of particular concern for long-lived species such as the desert tortoise, because project-related effects may not become evident in individuals or populations until years later.

Effects from Construction and O&M

Death and injury of desert tortoises could result from excavation activities such as clearing and grubbing of vegetation; trenching activities and entrapment in open trenches and pipes; and collisions with or crushing by vehicles or heavy equipment, including individuals that take shelter under parked vehicles and are killed or injured when vehicles are moved. Desert tortoises that enter or attempt to cross project access roads may be struck resulting in death or injury. Mortality mechanisms also include individual desert tortoises or their eggs being crushed or buried in burrows during construction and O&M-related activities. Because of increased human presence in the area, desert tortoises may be killed or injured due to collection or vandalism associated with increased encounters with workers, visitors, and unauthorized pets. Desert tortoises may ingest or be entangled in trash or debris left on work sites, which may lead to death or injury (Walde et al. 2007). Desert tortoises may be attracted to the construction area by application of water to control dust, placing them at higher risk of death or injury. Desert tortoises may be adversely affected by construction noise, ground vibrations, and artificial lighting (Ruby et al. 1994). Culverts used in constructed roads may be used as burrows and shelter by desert tortoises, and tortoises could be trapped or entombed by debris or mud if culverts are not properly designed (Lovich et al. 2011). Long-term effects from wind energy facilities to desert tortoise populations are not well understood as only one facility currently exists; monitoring results from this facility have indicated that over time, desert tortoises appear to avoid areas of high turbine density and activity (Dr. Jeff Lovich, 2012, personal communication).

We estimate that all life stages of desert tortoise that occur on the SWEF and in harm's way on other project activity areas described above may be adversely affected by the proposed action. Our estimate of the numbers of desert tortoises and eggs that are likely to occur within the action area is mostly from pre-project survey data. We acknowledge, however, that not all individuals killed or injured during construction, operations, and maintenance activities will be detected by biological monitors or project staff and subsequently reported to us. The inability to detect all tortoises is largely due to the cryptic nature of desert tortoises, fossorial habits, and limited

abundance; and in the case of juveniles and eggs, their small size and location underground reduce detection probabilities of these life stages. Another confounding factor is that scavengers may locate, consume, or remove tortoise carcasses before monitors can locate them.

Overall, we expect death and injury of most subadult and adult tortoises to be avoided during construction and O&M activities through implementation of and compliance with proposed Conservation Measures. A waste management plan (Conservation Measure 1) and proper clean up after construction and maintenance activities (Conservation Measure 7) will reduce the likelihood of a desert tortoise ingesting or being entangled in trash or debris. Implementation of Conservation Measure 4 will minimize pooled water and leaks from water trucks and tanks and thus reduce this potential attractant that could draw desert tortoises to roads. Fencing of project features (Conservation Measure 8) where more human activity is likely to occur during O&M activities will reduce human-tortoise encounters. Employment of a WEAP, FCRs, authorized desert tortoise niologists, and biological monitors (Conservation Measure 9) will reduce tortoise occurrence in areas of surface-disturbing activities.

Project Access Effects

Primary access to the SWEF site would be via US-95 and SR-164. Access to project features would require construction of approximately 27.5 miles of access roads and the upgrading of approximately 9.4 miles of existing roads. Effects from the construction of access roads and upgrading of existing roads are described above (see *Construction and O&M).*

The primary effect of project access on desert tortoises is the risk of vehicle strikes due to the potential increase use of roads. Project access roads also may increase public use in the action area, which could result in additional morality or injury to desert tortoises. If designated project roads are not used, vehicles use could lead to soil compaction and vegetation changes, including decreased native plant cover and diversity, and increased erosion and non-native, invasive plant cover within the action area.

Implementation of Conservation Measures 2, 8, 9, and 10 are expected to minimize impacts to desert tortoises from increased vehicular use within the action area. Because 1) all workers will participate in the WEAP (Conservation Measure 9.s.), 2) desert tortoise caution signs will be installed on turbine access roads (Conservation Measure 9.h.), and 3) a transportation plan will be enforced to reduce speed limits from 20 miles per hour during desert tortoise low activity periods to under 15 miles per hour during desert tortoise high activity periods (Conservation 10), workers may be less likely to strike desert tortoises than a casual user. In addition, clearance surveys (Conservation Measures 9.q. and 10) and the use of authorized desert tortoise biologists and monitors during construction of the access roads (Conservation Measures 9.a. and 9.b.).

We cannot predict how many individuals will be killed or injured due to project-related access because of variables such as weather conditions, the nature and condition of roads, public use which may be confused with project use, and activity patterns of desert tortoises at the time the roads are in use; however, we expect this number to be small.

Effects of Habitat Loss and Fragmentation

Approximately 388.5 acres of occupied desert tortoise habitat would be disturbed as a result of the proposed project (Table 2). This disturbance would occur within a larger project boundary (Figure 2). Although the majority of the project would not occur in designated CH, habitat throughout the project area has similar characteristics to that in the PECHU which surrounds it. Habitat in this area has been modeled as highly suitable for desert tortoises (Nussear et al. 2009), and tortoise surveys conducted for the SWEF project indicate a moderate to high density of tortoises in the area. The removal of food and shelter resources used by desert tortoises could cause tortoises to alter their use of the area or leave it completely. Surface-disturbing activities resulting from the construction of project features could increase erosion, leading to degraded habitat (Belnap et al. 2008), which may have a negative impact on desert tortoises.

Table 2. Anticipated disturbance of desert tortoise habitat that would result from the SWEF project.

Project Feature	Total Acres of New Habitat Disturbance (acres)	Approximate Temporary Construction Disturbance (acres)[1/]	Approximate Permanent Construction Disturbance (acres)
Turbine pads	69.2	66	3.2
New and upgraded project roads and crane pads[2/]	253.0	111.4	141.6
Operations and maintenance facility	6.5	1.5	5.0
Equipment storage and construction laydown areas[3/]	28.3	28.3	0
Overhead transmission line right-of-way	16.5	16.5	0
Substations	7.0	5.0	2.0
Batch plant	1.0	1.0	0
Meteorological towers	0.01	0	0.01
WAPA's switching station	6	2.5	3.5
Total Estimated Impacts	**388.5**	**232.2**	**155.3**

1/ Temporary construction impacts are in addition to permanent impacts.
2/ Restoration of roadsides.
3/ Includes temporary office trailers and crane assembly areas.

Because recovery of vegetation in the desert can take decades or longer, we consider all ground-disturbing impacts associated with the proposed project to be long-term. Vasek et al. (1975) determined that in the Mojave Desert transmission line construction and O&M activities resulted in an unvegetated maintenance road, enhanced vegetation along the road edge and between tower sites (often dominated by nonnative species), and reduced vegetation cover under the towers, which recovered significantly but not completely in about 33 years. Webb (2002) determined that extensive disturbance and compaction in the Mojave Desert with no active restoration, soils in this environment could take between 92 and 124 years to recover. Other studies have shown that recovery of plant cover and biomass in the Mojave Desert could require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Based on a quantitative review of studies evaluating post-disturbance plant recovery and success in the Mojave and Sonoran

deserts, Abella (2010) determined that reestablishment of perennial shrub cover (to amounts equivalent to undisturbed areas) generally occurs within 100 years but no fewer than 40 years in some situations. He also determined that a number of variables likely affect vegetation recovery times, including but not limited to climate (e.g., precipitation and temperatures), invasion by nonnative plant species, and the magnitude and extent of ongoing disturbance.

Habitat fragmentation by roads and other project features are likely to alter desert tortoise distribution and use of the project area. Desert tortoise use of the project area may decrease or discontinue due to the increased density and use of roads, especially during construction when traffic volume will be highest (Hoff and Marlow 2002, Boarman and Sazaki 2006). Latch et al. (2011) demonstrated that roads, regardless of traffic volume and construction material, can significantly influence desert tortoise movements and therefore, gene flow at the local population level with almost immediately detectable effects. We expect these effects to be subtle and not immediately obvious but detectable over the duration of the project.

We anticipate some tortoises using the Action Area may shift or reduce their home ranges due to habitat fragmentation and degradation, but much of the habitat will remain intact and suitable and continue to be used by tortoises. Additionally, by implementing a weed management plan (Conservation Measure 2) and site rehabilitation and facility decommissioning plan (Conservation Measures 3) and restricting vehicles from inadvertent habitat disturbance, the extent of habitat fragmentation and degradation will be minimized.

Effects from Desert Tortoise Handling

Capturing and handling of tortoises for the purpose of moving them out of harm's way may result in accidental death or injury if these methods are performed improperly, such as during extreme temperatures, or if individuals void their bladders and are not rehydrated. Averill-Murray (2002) determined desert tortoises that voided their bladders during handling had lower overall survival rates (0.81 to 0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures and procedures, such as reused latex gloves, pathogens may be spread among individuals. Because the Applicant would employ desert tortoise biologists approved by the Service and adhere to the most recent handling guidelines, we anticipate any mortality or injury to desert tortoises from activities associated with removing individuals from the proposed project site is unlikely.

Effects from Relocating Desert Tortoises

The Applicant provided measures include protocols to minimize effects to desert tortoises from moving them. Desert tortoises located in harm's way would be moved a safe distance from the location they were detected to an area of undisturbed desert habitat (e.g., more than 200 feet but less than 1,000 feet, at the discretion of the qualified desert tortoise biologist but would not be translocated as a result of the project. Because relocated tortoises would be moved a short distance and within their home ranges, we do not anticipate density-dependent effects to the population within the Action Area. Because the Applicant would employ desert tortoise

biologists approved by the Service and adhere to the most recent Service guidance in addition to implementing the conservation measures (Conservation Measure 9) outlined in the proposed action, we anticipate any mortality or injury to desert tortoises from activities associated with relocating individuals into nearby areas within the Action Area is unlikely.

Effects from Predator Subsidies

Common ravens and coyotes are attracted to human activities in the desert because of food and water subsidies, and roosting and nesting substrates that would otherwise be unavailable. Human activities also facilitate expansion of raven and coyote populations into areas where they were previously absent or in low abundance. Ravens likely will frequent the project areas because of the potential availability of such subsidies. Road-kill of wildlife along US-95 and SR-164 provides additional attractants and subsidies for opportunistic predators and scavengers; road-kill is not likely to increase appreciably as a result of the project as US-95 and SR-164 are heavily traveled highways.

Facility infrastructure, such as power poles, fences, buildings, and other structures on the project site, may provide perching, roosting, and nesting opportunities for ravens and other avian predators. Natural predation rates may be altered or increased when natural habitats are disturbed or modified. As stated above, common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in the Mojave Desert prior to 1940, the existing level of raven predation on juvenile desert tortoises is considered an unnatural occurrence (BLM 1990). In addition to ravens, feral dogs have emerged as significant predators of desert tortoises adjacent to residential areas. Though feral dogs may range several miles into the desert and have been found digging up and killing tortoises (Evans 2001), we are not aware of any reports of feral dogs in the project area.

To avoid and minimize the availability of project sources for predator, subsidies will be minimized by Conservation Measure 9.w., which proposes monitoring for the presence of ravens and other predators. Conservation Measures 1, 5, and 9.e. will minimize terrestrial predators and raptors and ravens in the project area by reducing attractants and perching opportunities. Specific minimization actions to be implemented include onsite trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.

Effects from Nonnative Plant Species

Another indirect effect from the development of the proposed project is the potential introduction and spread of nonnative, potentially invasive plant species into habitats adjacent to the project sites. Construction and O&M activities of the proposed project components may increase distribution and abundance of nonnative species within the action area due to ground-disturbing activities that favor these species. Project equipment may transport nonnative propagules into the project area where they may become established and proliferate. In addition, the introduction

of nonnative plant species may lead to increased wildfire risk, which ultimately may result in future habitat losses (Brooks et al. 2003) and changes in forage opportunities for desert tortoises.

The Applicant proposed conservation measures as part of the proposed action to address the potential effects from nonnative plant species. Conservation Measure 2 describes a Weed Management Plan, which will be approved by BLM prior to the initiation of ground-disturbing activities. Measures in the Weed Management Plan include: noxious weed inventory, identification of problem areas, preventative measures, herbicide treatment methods and protocol, monitoring requirements. Conservation Measure 3 describes a Site Rehabilitation and Facility Decommissioning Plan, which will include restoration and revegetation activities that should address nonnative plant infestations.

While we cannot reasonably predict the increase in nonnative species abundance that this project may cause within the action area, the degradation of habitat due to spread of nonnative plants would be minimized through the measures outlined above and in the Weed Management Plan.

Edge Effects

Increased noise levels and the presence of full-time facility lighting may affect desert tortoise behavior during construction and operations of the facility over a 30-year period. While limited data exist on the effect of noise on desert tortoises, Bowles et al. (1999) demonstrated that the species has relatively sensitive hearing (i.e., mean = 34 dB SPL), but few physiological effects were observed with short-term exposures to jet aircraft noise and sonic booms. These results cannot be extrapolated to chronic exposures over the lifetime of an individual or a population. Additionally, we do not have sufficient data documenting the effects of seismic vibrations or artificial lighting on desert tortoise behavior and therefore, cannot reasonably predict the magnitude of effect noise, seismic vibrations, or light will have on adjacent desert tortoise populations. Based on the ability of other species to adapt to noise disturbance, noise attenuation as distance from the project increases, and the fact that desert tortoises do not rely on auditory cues for their survival, we do not expect any desert tortoises to be injured or killed as a result of project-related noise impacts. In addition, the Applicant has included measures as part of the proposed action to minimize noise and light-related impacts to the species (Conservation Measure 6).

Because few data exist relative to edge effects from noise, light, vibration, and increased dust from construction and O&M activities, we cannot determine how these potential impacts may affect desert tortoise populations adjacent to the development sites. The lack of information is especially relevant when evaluating effects to individuals within the habitat linkage that would be impacted by the proposed project. Thus, the magnitude and extent of these edge effects cannot be articulated at this time, but conceivably could disturb individual desert tortoises to the extent that they abandon all or a portion of their established home ranges and move elsewhere.

Effects on Population Connectivity

Landscape genetic analysis performed by Latch et al. (2011) identified both natural (slope) and anthropogenic (roads) landscape variables that significantly influenced desert tortoise gene flow of a local population. Although they found a higher correlation of genetic distance with slope compared to roads, desert tortoise pairs from the same side of a road exhibited significantly less genetic differentiation than tortoise pairs from opposite sides of a road. Latch et al. (2011) demonstrated that roads, regardless of traffic volume and construction material, can significantly influence desert tortoise movements and therefore, gene flow at the local population level with almost immediately detectable effects.

As discussed in the revised recovery plan (Service 2011) and elsewhere, habitat linkages are essential to maintaining rangewide genetic variation (Edwards et al. 2004, Segelbacher et al. 2010) and the ability to shift distribution in response to environmental stochasticity, such as climate change (Ricketts 2000, Fischer and Lindenmayer 2007, EPA 2009). Natural and anthropomorphic constrictions (e.g., US-95) can limit gene flow and the ability of desert tortoises to move between larger blocks of suitable habitat and populations. In the action area, existing anthropomorphic constrictions compound effects of natural barriers on desert tortoise population connectivity.

Based on research from other projects, roads and other features of the Searchlight Wind Energy Facility may affect movement of tortoises. We anticipate desert tortoises will shift away from project features, which could alter gene flow patterns and affect local genetic structure without completely disconnecting populations. However, because no major anthropomorphic constrictions (e.g., major roads, fences) would be constructed for this project, we, therefore, do not anticipate the proposed action would impede population connectivity.

Critical Habitat

Project equipment may compact soils and transport weeds into the project area where they may become established, thus reducing the capability of critical habitat to serve its role for recovery of the tortoise. Additionally, the introduction of noxious weeds may lead to increased wildfire risk (Brooks et al. 2003). Measures proposed by BLM to restore disturbances, implement a fire protection plan, and implement a weed monitoring and management plan should minimize or eliminate these potential effects.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Increased development would cause continued habitat loss, degradation, and fragmentation for the local desert tortoise population; as well as increased harm and harassment of individual desert tortoises, contributing to the cumulative degradation of the area. Planned future actions such as future industrial solar power plants and wind energy facilities would likely continue this trend. However, we know of no specific proposal by any non-Federal entity in the action area. The Service determined that most other future actions in the action area would likely require section 7 consultation since the action area is managed by BLM.

CONCLUSION

After reviewing the current status of the Mojave desert tortoise, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the species, and is not likely to adversely modify designated critical habitat. We have reached this conclusion based on the following factors:

- BLM, the applicant, and their contractors will implement numerous measures outlined above to ensure that most tortoises are located and moved out of harm's way and potential desert tortoise injury and mortality is minimized on project work sites (e.g., clearance surveys, authorized desert tortoise biologists, desert tortoise monitors). Since these measures will be implemented, we anticipate that the level of take will be low.

- BLM, the applicant, and their contractors will implement measures that are outlined above to ensure that impacts to desert tortoise critical and non-critical habitat are minimized.

- The project would not significantly affect the rangewide number, distribution, or reproduction of the species; desert tortoises that are moved out of harm's way and placed within their home range will remain in the wild with no long-term adverse effects to survival and reproduction;

- PCEs of critical habitat would be adversely affected but not to the extent they would no longer function within the PECHU or reduce the capability of the PECHU to support the current number of tortoises in the PECHU; amount to be disturbed is small (7 acres).

- This project would not result in a substantial increase in fragmentation of desert tortoise habitat because BLM would implement measures to minimize fragmentation within the Action Area and much of the area would remain intact and suitable for tortoises. ;

- The potential spread of non-native plant species would be minimized through implementation of an invasive weed management plan.

- Compensation requirements through BLM would result in implementing recovery actions for the desert tortoise, as identified by BLM and the Service.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulation pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below for desert tortoises are non-discretionary and must be undertaken by BLM so that they become binding conditions of any grant or permit issued to the applicants/permittees, as appropriate, for the exemption in section 7(o)(2) to apply. BLM has a continuing duty to regulate the activity covered by this incidental take statement. If BLM: 1) fails to assume and implement the terms and conditions; or 2) fails to require the Applicant to adhere to the terms and conditions of the incidental take statement through enforceable stipulations that are incorporated into the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, BLM must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT AND EXTENT OF TAKE

The proposed action will result in take of all desert tortoises that occur on project work sites and roads; and areas where tortoise exclusion fencing would be installed. Additional desert tortoises in the action area, including buffer areas, may be affected by the project to the extent that incidental take may occur; however, such effects are anticipated to be minor and involve mostly alteration in feeding, sheltering, and reproductive behavior due to project disturbances and the reduction or fragmentation of habitat in their home ranges.

We acknowledge that we cannot precisely quantify the amount of take that will occur during all project activities. Some of the constraints that make it difficult to determine desert tortoise densities and abundance include the cryptic nature of the species (i.e., individuals spend much of

their lives underground or concealed under shrubs), inactivity in years of low rainfall, and low abundance across a broad distribution within several different habitat types. In addition, population numbers and distribution of individuals fluctuate in response to weather patterns and other biotic and abiotic factors over time. The number of juvenile desert tortoises and eggs is even more difficult to quantify because of their small size, their location underground, and low detection probabilities during surveys. The following paragraphs define the form of take and the number of individuals we anticipate will taken by project activities.

TAKE FROM CONSTRUCTION AND O&M ACTIVITIES

Table 3 identifies the incidental take threshold for all age classes of desert tortoises during construction and O&M activities and the estimated loss of critical and non-critical habitat. The actual number of individuals missed during clearance surveys and killed during construction is unknown. We expect most tortoises missed would be hatchlings and juveniles. Locating the carcasses of small tortoises or egg fragments is unlikely. To address this issue, we have used the threshold for capture of subadult and adult individuals on the proposed project site as a surrogate measure of mortality of the smaller size classes and eggs. Using this threshold as a surrogate assumes that our method of calculating the number of reproductive females, which is based on the estimated abundance of subadult and adult desert tortoises on the proposed project sites, allows us to also calculate the number of juveniles and eggs that may be affected. Consequently, finding more than 51 subadult and adult desert tortoises on the SWEF would indicate that a larger number of juveniles and eggs may be killed or destroyed during construction.

Although we do not know how many desert tortoises will be encountered in harm's way, based on the proposed action and tortoise survey, we estimate that 50 desert tortoises may be located in harm's way and captured and moved out of harm's way during construction activities. We estimate 3 desert tortoises per year may be located in harm's way and captured and moved out of harm's way during O&M activities. No more than one subadult or adult desert tortoise and two hatchling or juvenile tortoise would be killed or injured during construction activities. No more than one subadult or adult desert tortoise and two hatchling or juvenile tortoise not to exceed one per calendar year would be killed or injured during O&M activities.
O&M activities may result in incidental take, in the form of mortality or injury, of no more than two subadult or adult desert tortoise and two hatchling or juvenile desert tortoises but not to exceed more than one per calendar year for each of the two size groups (Table 3).

The disturbance of up to 388.5 acres of habitat from construction or upgrading activities for the SWEF, including access roads, turbine pads, project facilities, and transmission lines, may result in harm to desert tortoises that use this area as part of their home range. If the proposed project-related activities result in impacts to desert tortoise habitat beyond this acreage, the amount or extent of take will be exceeded.

Table 3. Desert Tortoise Incidental Take Thresholds for the Searchlight Wind Energy Project, Clark County, Nevada.

Activity	Exempted Mortality, Injury, and Destruction		Exempted Capture and Handling		Anticipated Habitat Loss (acres)	
	Adults / Subadults	Juveniles / Hatchlings	Adults / Subadults	Juveniles / Hatchlings	Critical	Non-critical
Construction	1	2	All in harm's way; estimate = 50	All in harm's way; Unknown	7	382
Operation and Maintenance	1	2[1]	All in harm's way; estimate = 3/year	All in harm's way; Unknown	0	0

[1]Not to exceed one per calendar year.

After facility closure, decommissioning activities and restoration of long-term disturbances from the SWEF would be conducted. Because we do not have sufficient information regarding the method or extent of these activities, we cannot determine the level of take that would be associated. Consequently, we are not granting an exemption from the prohibitions against take for these activities. These actions would require reinitiating consultation.

EFFECT OF TAKE

In the accompanying biological opinion, the Service determined that the levels of anticipated take associated with this project alone are not likely to jeopardize the continued existence or adversely affect the recovery of the Mojave desert tortoise, and the action is not likely to result in the destruction or adverse modification of its critical habitat.

REASONABLE AND PRUDENT MEASURES (RPMS) WITH TERMS AND CONDITIONS

BLM and the Applicant will implement numerous conservation measures as part of the proposed action to minimize the incidental take of desert tortoises. Our evaluation of the proposed action is based on the assumption that the actions as set forth in the *Description of the Proposed Action – Conservation Measures* section of this biological opinion will be implemented. Any proposed changes to the conservation measures or in the conditions under which project activities were evaluated may constitute a modification of the proposed action. If this modification causes an effect to desert tortoises that was not considered in the biological opinion, reinitiation of formal

consultation pursuant to the implementing regulations of section 7(a)(2) of the Act (50 CFR § 402.16) may be warranted. The following RPMs supplement and clarify conservation measures included as part of the proposed action. The RPMs are necessary and appropriate to minimize the impact of take on desert tortoises.

To be exempt from the prohibitions of section 9 of the Act, BLM and the Applicant, including all agents and contractors, must comply with the following terms and conditions, which implement the RPMs described below, and are intended to minimize the impact of incidental take on the Mojave desert tortoise. These terms and conditions are non-discretionary.

RPM 1: *BLM shall ensure the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.*

Terms and Conditions:

The following terms and conditions implement RPM 1:

1.a. To ensure that the conservation measures are effective and properly implemented, the Service shall be informed immediately upon discovery of a desert tortoise that has been killed or injured as a result of project activities. At that time, and in coordination with the Service, BLM must review the circumstances surrounding the incident to determine whether additional protective measures are required. Project activities may continue pending outcome of the review, provided the conservation measures included as part of the proposed action (see *Conservation Measures* section) and the terms and conditions in this biological opinion have been and continue to be fully implemented.

1.b. We do not expect that take, in the form of capture and handling, required to move desert tortoises out of harm's way during construction and O&M activities will result in mortality or injury of any individuals. If desert tortoise mortalities and injuries exceed thresholds identified in Table 3, BLM must reinitiate consultation on the proposed action. This term and condition only applies to clearance of the project sites for construction and does not apply to the relocation of desert tortoises out of harm's way.

1.c. BLM shall coordinate with the Service to develop a monitoring program to determine long-term project impacts on desert tortoise occurrence and distribution in the Action Area.

RPM 2: *BLM shall ensure that desert tortoises and their eggs in harm's way are located, properly handled, and moved to safety.*

Terms and Conditions:

2.a. A desert tortoise education program shall be presented by an authorized desert tortoise biologist to all personnel onsite during construction activities. This program will contain information concerning the biology and distribution of the desert tortoise, its legal status and occurrence in the project area, the definition of take and associated penalties, measures designed to minimize the effects of construction activities, the means by which employees can facilitate this process, and reporting requirements to be implemented when desert tortoises are encountered.

2.b. A designated field contact representative (FCR) will be assigned to the construction phase of the SWEF; additional FCRs will be assigned for the linear project components including the transmission line on the BLM ROW. Authorized desert tortoise biologists and the FCRs shall be onsite during all construction activities to ensure compliance with this biological opinion, including avoidance of inadvertently harming any desert tortoises that may wander onto the construction site. The authorized desert tortoise biologist and FCRs shall be responsible for: 1) enforcing the litter-control program; 2) ensuring that desert tortoise habitat disturbance is restricted to authorized areas; 3) ensuring that all equipment and materials are stored within the boundaries of the construction zone or within the boundaries of previously-disturbed areas or designated areas; 4) ensuring that all vehicles associated with construction activities remain within the proposed construction zones; and 5) ensuring compliance with the conservation measures of this biological opinion.

Potential authorized desert tortoise biologists must submit their statement of qualifications to the Service's Nevada Fish and Wildlife Office for approval, allowing a minimum of 30 days for Service response. The statement form is available on the internet at:
http://www.fws.gov/nevada/desert_tortoise/auth_dt_form.htm.
Within 3 days of employment or assignment, the Applicant or BLM, shall provide the Service with the names of FCRs and biological monitors who assisted the authorized desert tortoise biologist.

2.c. Prior to surface-disturbing activities, authorized desert tortoise biologists potentially assisted by project monitors, shall conduct a clearance survey to locate and remove all desert tortoises from areas to be disturbed or harm's way using techniques providing full coverage of all areas. Two passes of complete coverage will be accomplished. The authorized desert tortoise biologists shall also capture, handle, and relocate desert tortoises from harm's way in accordance with the Desert Tortoise Field Manual (Service 2009), as appropriate. Any desert tortoise eggs found in harm's way will be relocated from harm's way, up to 1,000 feet

from the point of capture, by an authorized desert tortoise biologist in accordance with approved protocol (Service 2009). Desert tortoise burrows that occur immediately outside work areas that can be avoided by project activities shall be clearly marked or flagged to prevent crushing. Burrows occupied by adult females will be examined thoroughly for nests and eggs during the months of May through October.

2.d. All burrows found within areas proposed for disturbance, whether occupied or vacant, shall be excavated by an authorized desert tortoise biologist and collapsed or blocked to prevent desert tortoise re-entry. All burrows will be excavated with hand tools to allow removal of desert tortoises or desert tortoise eggs. All desert tortoise handling and excavations, including nests, will be conducted by an authorized desert tortoise biologist in accordance with Service-approved protocol (Service 2009).

2.e. For desert tortoises that need to be relocated out of harm's way, the tortoise should be placed out of the path of project activity as per the instructions and guidance from the authorized desert tortoise biologist.

2.f. If a tortoise is found and relocated to a safe area, an authorized desert tortoise biologist, biological monitor, or FCR shall inform workers in the area to be particularly watchful for the tortoise as it may return to the work area.

2.g. Areas underneath parked project vehicles and equipment will be inspected for desert tortoises before moving them.

2.h. Vehicle speeds within the project area will not exceed those identified in the Conservation Measure 10 proposed under the *Description of the Proposed Action.* Speed limits will be clearly marked and all workers will be made aware of these limits.

2.i. Water used for fugitive dust control will not be allowed to pool on access roads or other project areas outside the fenced area, as this can attract desert tortoises. Similarly, leaks on water trucks and water tanks will be repaired to prevent pooling water.

2.j. Should any desert tortoise be injured or killed, all activities that have the potential for take will be halted, features that present a danger to desert tortoises (e.g., open trenches) will be secured, and the FCR and/or authorized desert tortoise biologist immediately contacted, who will notify the appropriate office of the Service.

2.k. BLM and the Applicant shall implement appropriate measures, which may include measures not specified in this biological opinion, to ensure that desert tortoises

captured and moved, or occurring in harm's way do not die or become injured as a direct or indirect (e.g., predation, maladjustment to release areas) result of the project. Measures in this biological opinion may require modification, and additional measures may be necessary in response to conditions and situations that pose a threat to the well-being of desert tortoises, in consultation with the Service.

RMP 3: *BLM shall ensure implementation of measures to minimize predation on desert tortoises by ravens or other desert tortoise predators attracted to the action area.*

Terms and Conditions:

3.a. A litter control program shall be implemented to reduce the attractiveness of the area to opportunistic predators such as desert kit fox, coyotes, and common ravens. Trash and food items will be disposed properly in predator-proof containers with re-sealing lids. Trash containers will be emptied and construction waste will be removed daily from the project area and disposed of in an approved landfill.

3.b. The Applicant will monitor for the presence of ravens and other potential human-subsidized predators will be conducted and a control plan will be implemented if predator densities substantially increase in the vicinity of the facility, in coordination with the Service. In addition to trash management, the Applicant will implement BMPs to discourage the presence of ravens onsite including elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.

3.c. Dogs will be prohibited in all project work areas.

RMP 4: *BLM shall ensure implementation of measures to minimize loss and long-term degradation of desert tortoise habitat, such as soil compaction, erosion, crushed vegetation, or introduction of non-native invasive plants or weeds as a result of project activities.*

Terms and Conditions:

4.a. Perennial native vegetation will be flagged and avoided to the maximum extent practicable.

4.b. Cross-country travel and travel outside designated areas shall be prohibited.

4.c. The Applicant and BLM will coordinate to salvage and relocate cacti, yuccas, and shrubs on linear ROWs and plant them back on temporarily disturbed portions of the ROWs.

4.d. All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously-disturbed areas whenever possible.

4.e. The Applicant will develop a habitat restoration plan to be implemented for all temporary disturbances associated with construction of the project to be approved by BLM and the Service.

4.f. The proposed Weed Management Plan will be developed and implemented (Conservation Measure 2) and will be approved by BLM and the Service.

4.g. Final power transmission tower and associated spur road locations will be adjusted to avoid potentially active tortoise burrows.

4.h. Prior to surface-disturbing activities associated with the SWEF, BLM shall collect remuneration fees for compensation of desert tortoise habitat loss (Appendix A). Remuneration fees shall be used for management actions, as identified by the BLM and Service, expected to promote recovery of the desert tortoise over time. Actions may involve habitat acquisition, population or habitat enhancement, increasing knowledge of the species' biological requirements, reducing loss of individual animals, documenting the species status and trend, and preserving distinct population attributes.

BLM estimates that 382 acres of non-critical habitat and 7 acres of critical habitat will be disturbed. The current rate is $810 per acre of disturbance outside desert tortoise critical habitat. The fees will be indexed for inflation based on the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers (CPI-U) and becomes effective March 1 of each year. The next adjustment will occur March 1, 2013. Information on the CPI-U can be found on the internet at: http://www.bls.gov/news.release/cpi.toc.htm. Total fees for project disturbance of desert tortoise non-critical habitat will be (382 acres x $810) $309,420.

For disturbance of critical habitat on BLM lands, the fee would be assessed at the rate of (4 x $810) $3,240 per acre of disturbance (Hastey et al. 1991). Total fees for project disturbance of desert tortoise critical habitat will be (7 acres x $3,240) $22,680.

This fee will be paid directly to BLM. The payment shall be accompanied by the Section 7 Fee Payment Form and completed by the payee. Payment shall be certified check or money order payable to BLM, and delivered to:

DOI/BLM
ATTN: Information Access Center
The Bureau of Land Management
1340 Financial Boulevard
Reno, Nevada 89502
Contact: (775) 861-6400

RPM 5: *BLM shall ensure implementation of measures to ensure compliance with the RPMs, Terms and Conditions, reporting requirements, and reinitiation requirements contained in this biological opinion.*

Terms and Conditions:

5.a. BLM will hold a preconstruction meeting with Duke Energy and the compliance inspection contractor (CIC) to discuss implementation of the terms and conditions of the biological opinion.

5.b. Construction and O&M reporting requirements: BLM will be responsible for providing immediate notification to the Service of any desert tortoise mortality or injury that occurs during construction or O&M activities.

The authorized desert tortoise biologist shall record each observation of desert tortoise handled in the tortoise monitoring reports. Information will include the following: location (GPS), date and time of observation, whether desert tortoise was handled, general health and whether it voided its bladder, location desert tortoise was moved from and location moved to, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures.

BLM will be responsible for providing a final report within 90 days of completion of the construction activities of the SWEF to the Service reports shall be provided to the Service during O&M activities for the life of the facility. Specifically, these reports must include Table 4 (see below), the information described above, and information on any instances when desert tortoises were killed, injured, or captured and handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from reoccurring. Additional information regarding the effectiveness of minimization measures and RPMs of this biological opinion should be included in the annual report.

Table 4. Desert Tortoise Actual Incidental Take for the Searchlight Wind Energy Project, Clark County, Nevada.

Activity	Actual Mortality, Injury, and Destruction		Actual Harassment: Capture and Removal		Actual Habitat Loss (ac)	
	Adults / Subadults	Juveniles / Hatchlings	Adults / Subadults	Juveniles / Hatchlings	Critical	Non-critical
Construction						
Operation and Maintenance						
Predation					None	
Minimization Measure Implemented	**Effectiveness and Recommendations**					

5.b. Any incident occurring during project activities that was considered by the FCR, authorized desert tortoise biologist, or biological monitor to be in non-compliance with this biological opinion will be documented immediately by the authorized desert tortoise biologist.

REPORTING REQUIREMENTS

BLM will be responsible for providing monthly reports during construction and annual reports during O&M activities. BLM may delegate this responsibility to the Applicant. In addition, a final construction report will be submitted to the Service within 60 days of completion of construction of the project. All monthly reports are due within 10 days following the end of the month and annual reports are due February 1 of each year. The Service anticipates the first annual report by February 1, 2014, if construction or project activities are initiated in 2013. Annual reports shall be provided to the Service during O&M activities for the life of the facility. Specifically, these reports must include Table 4 (see above) and information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from reoccurring.

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	Adults / Subadults	Juveniles / Hatchlings	Adults / Subadults	Juveniles / Hatchlings	Critical	Non-critical
Construction						
Operation and Maintenance						
Predation					None	
Minimization Measure Implemented	**Effectiveness and Recommendations**					

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Any incident occurring during project activities that was considered by the FCR, authorized desert tortoise biologist or biological monitor to be in non-compliance with this biological opinion will be documented immediately by the authorized desert tortoise biologist to be included in reporting.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

> *We recommend BLM develop a monitoring program to determine long-term project effects to desert tortoise abundance, distribution, and use of the project area in coordination with a university or government entity that will be able to disseminate information that is collected through peer-reviewed publications.*

REINITIATION NOTICE

This concludes formal consultation on the BLM's proposal to issue ROW grants to Searchlight Wind and WAPA for construction of the SWEF and its associated structures and components on BLM-administered lands. Consistent with 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of take specified in the incidental take statement is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; and 4) a new species is listed or critical habitat designated that may be affected by the action. In addition, if any of the stated assumptions used in our analysis are invalidated, BLM must reinitiate consultation.

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Personal Communications

Lovich, Jeffrey E. 2012. Deputy Director of the Southwest Biological Science Center, U.S. Geological Survey, Flagstaff, Arizona.

Appendix A

Appendix A. NEVADA BLM SECTION 7 LAND DISTURBANCE FEE PAYMENT FORM

Biological Opinion File Number: 84320-2012-F-0211

Biological Opinion Issued By: Nevada Fish and Wildlife Office, Las Vegas, Nevada

Species: Desert Tortoise (*Gopherus agassizii*) (Mojave population)

Project Name: Searchlight Wind Energy Project

Project Applicant: Searchlight Wind Energy, LLC

Phone Number:

Payment Calculations:	Clark County		_____ County		_____ County	
	Critical habitat	Non-critical habitat	Critical habitat	Non-critical habitat	Critical habitat	Non-critical habitat
# acres anticipated to be disturbed on federal land	7	382				
Fee rate (per acre)	$3,240	$810				
Subtotals	$22,680	$309,420				
Total cost per county	$ 332,100		$ -		$ -	

Amount paid: _____ **Date:** _____ **Check/Money Order #:** _____

Authorizing agencies: Bureau of Land Management, Las Vegas Nevada

Make check payable to: Bureau of Land Management

Deliver check to:

Physical Address
Bureau of Land Management
Attn: Information Access Ctr
1340 Financial Blvd.
Reno, NV 89502

PO Box
Bureau of Land Management
Attn: Information Access Ctr
PO Box 12000
Reno, NV 89520-0006

For BLM Public Room

Process check to:
Contributed Funds-All Other
WBS: LVTFF1000800
7122 FLPMA

Please provide a copy of this completed payment form and the payment receipt to NV-930, Attn: T&E Program Lead
***T&E Program Lead will provide a copy to the appropriate District Office(s)*

All other Res. Dev. Project and Management
Remarks: LLNV9300000 L71220000.JP0000 LVTFF1000800 Desert Tortoise Conservation Program

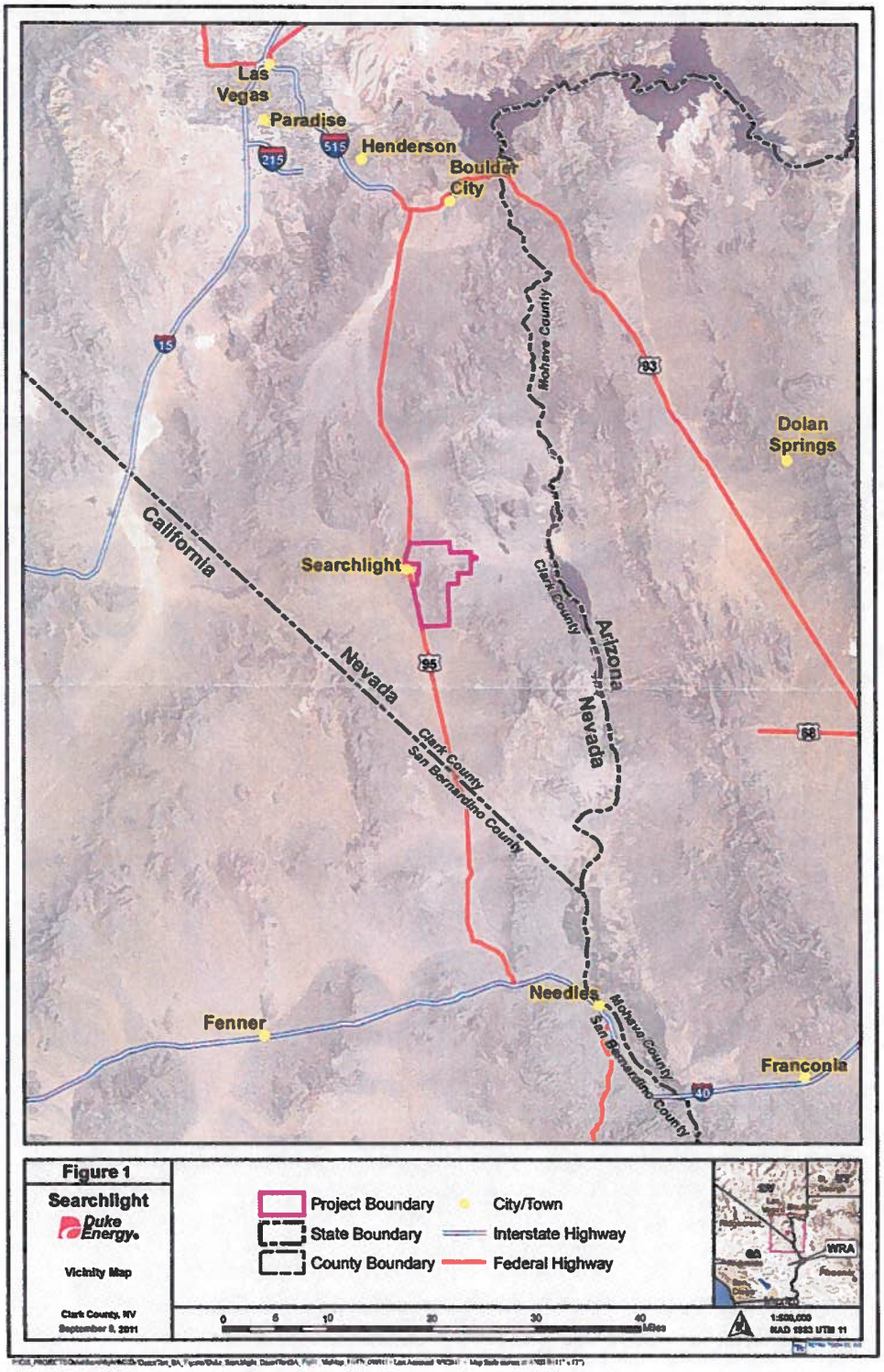

Figure 1. General location of the Searchlight Wind Energy Project, Clark County, Nevada.

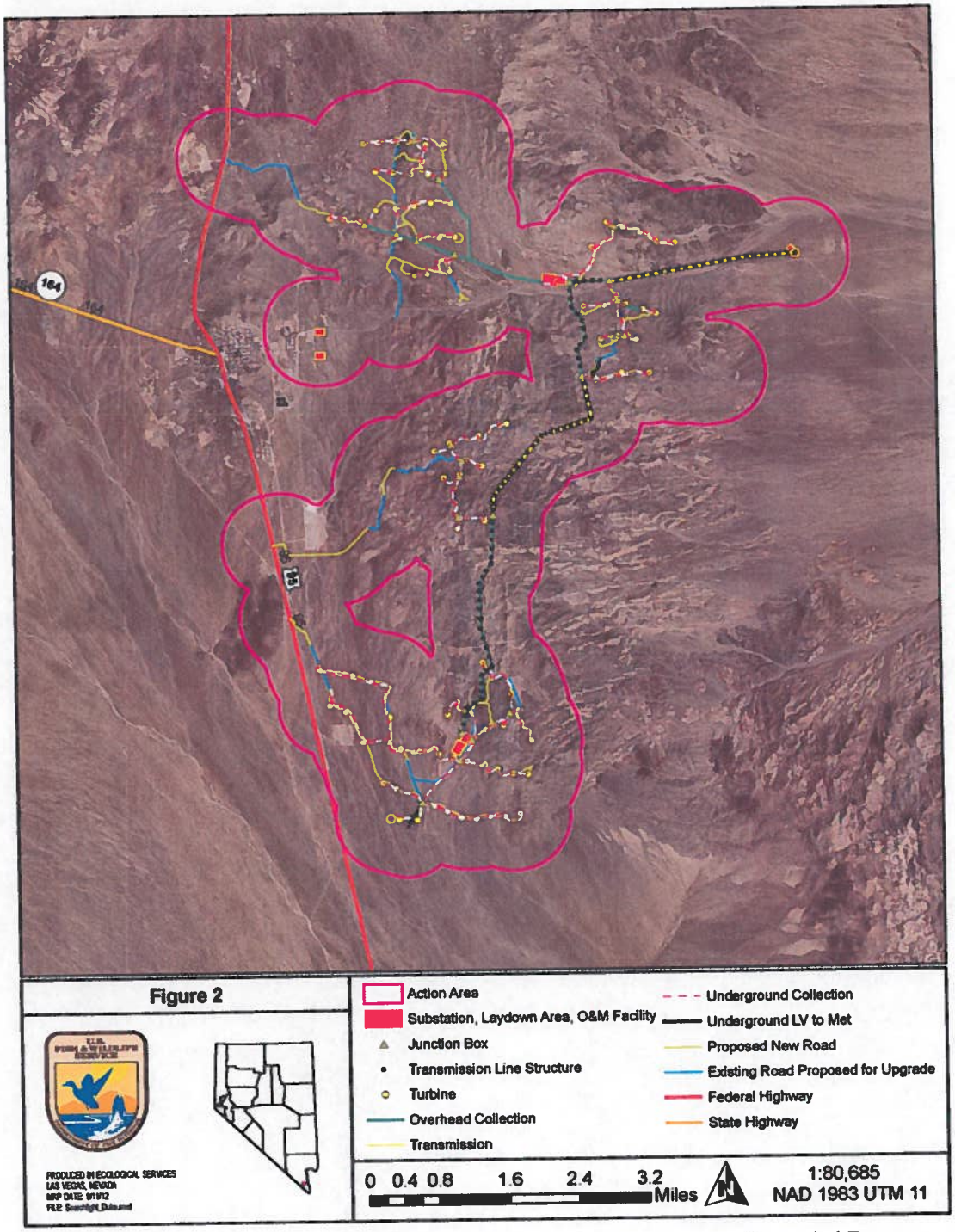

Figure 2. Action Area and approximate location of project features for the Searchlight Wind Energy Project, Clark County, Nevada.

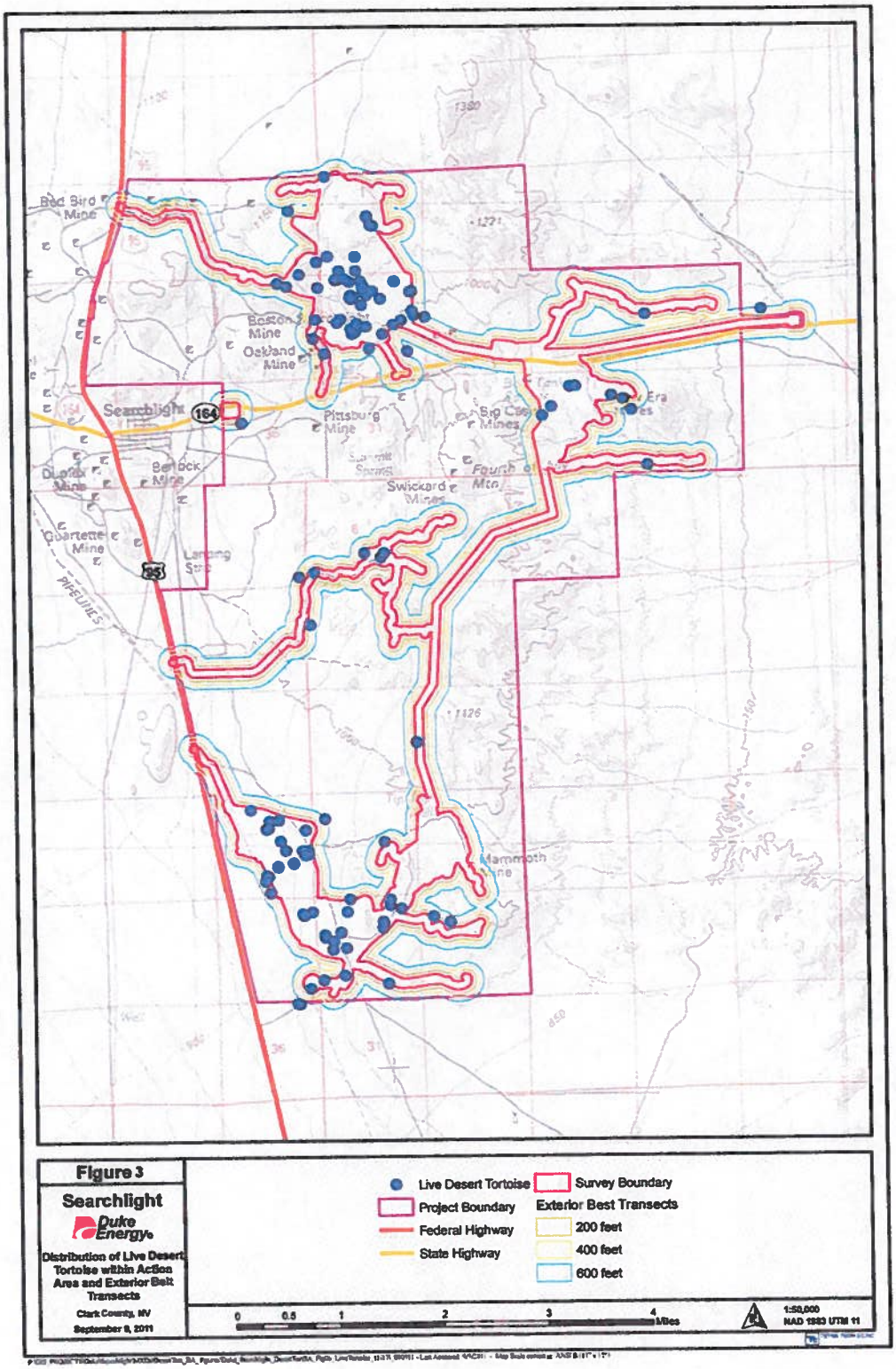

Figure 3. Locations of live Mojave desert tortoise detections on the Searchlight Wind Energy Project, Clark County, Nevada.

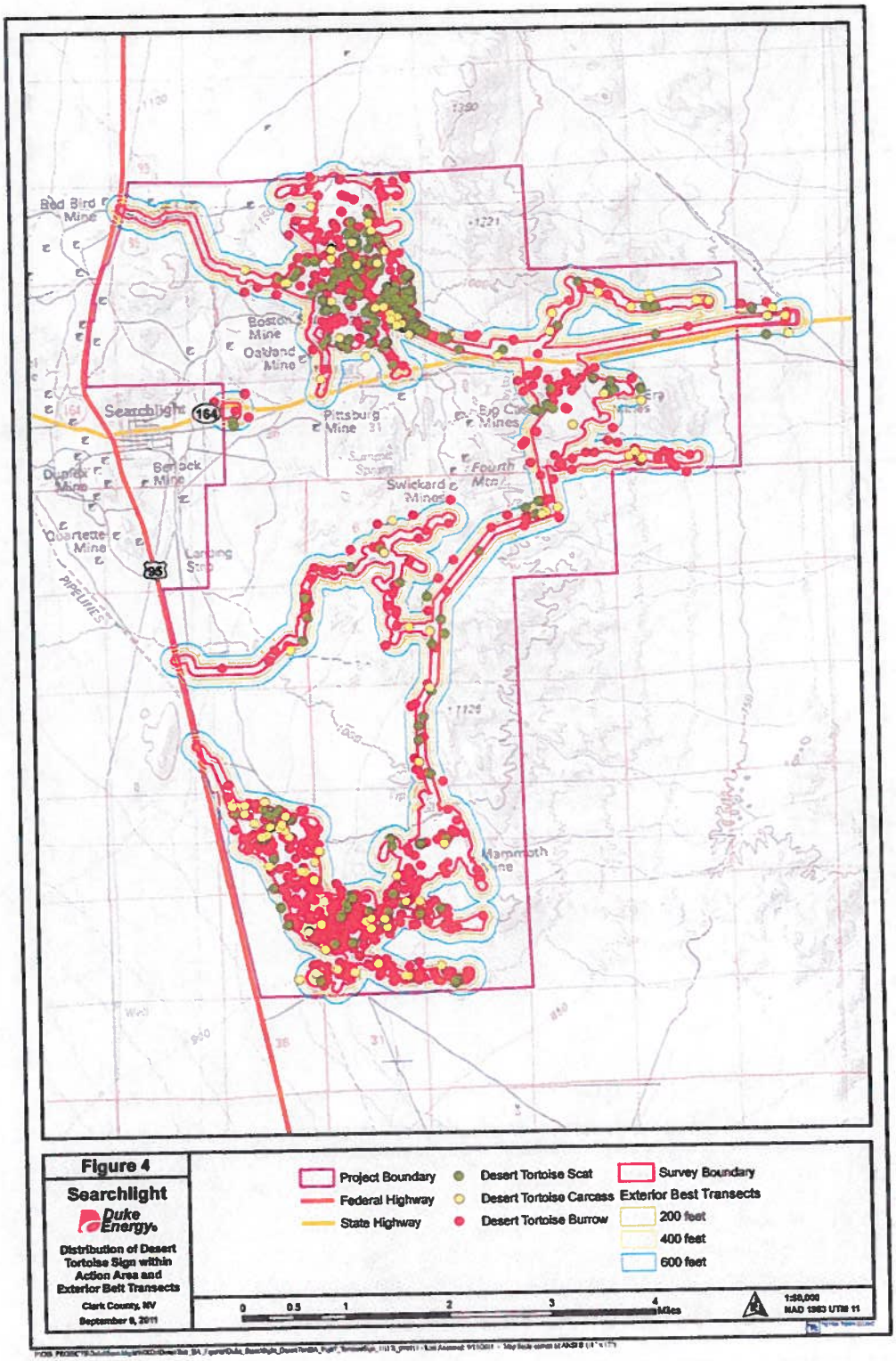

Figure 4. Locations of Mojave desert tortoise sign detected on the Searchlight Wind Energy Project, Clark County, Nevada.

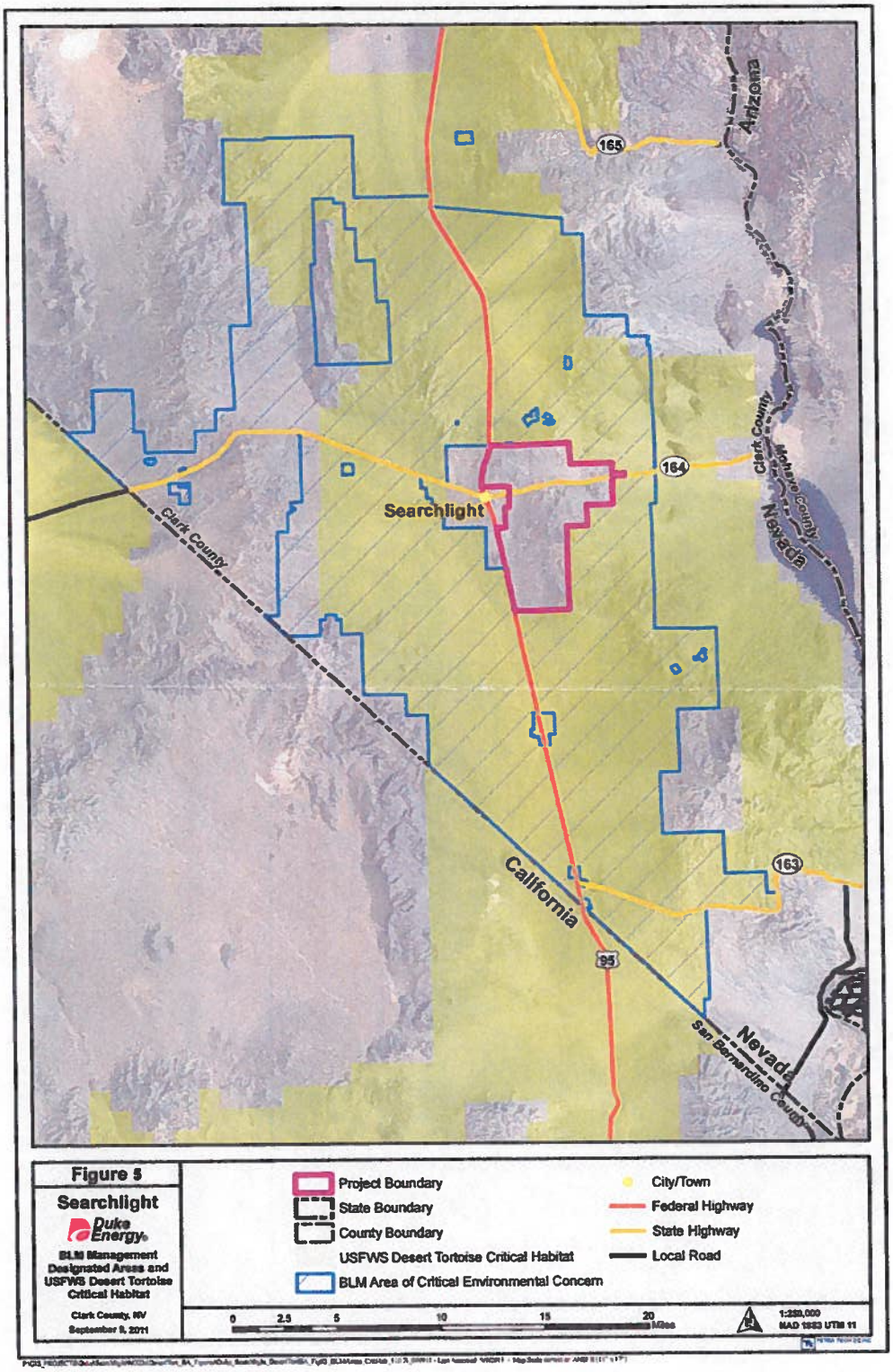

Figure 5. Designated desert tortoise critical habitat occurring near the Searchlight Wind Energy Project, Clark County, Nevada.

Appendix B-3: Terrestrial Wildlife Plan

Terrestrial Wildlife Plan

Searchlight Wind Project
Clark County, Nevada

Prepared For:

Searchlight Wind Farm, LLC

Prepared By:

TETRA TECH EC, INC.

Tetra Tech EC, Inc.
1750 SW Harbor Way, Suite 400
Portland, OR 97201

January 2012

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1 INTRODUCTION

1.1 BACKGROUND INFORMATION

Searchlight Wind Energy, LLC (Searchlight Wind; Applicant), a wholly-owned subsidiary of Duke Energy (Duke) has applied to the Bureau of Land Management (BLM) for a right-of-way (ROW) grant on public land to develop a wind energy project. Searchlight Wind is proposing to develop the Searchlight Wind Project (Project), an approximately 220 megawatt (MW) wind energy facility on a site located in southern Clark County, Nevada (Figure 1). The purpose of the project is to develop, own and operate a wind conversion facility that will contribute to Nevada's Renewable Portfolio Standards for electricity generation.

The United States Fish and Wildlife Service (USFWS) and the Nevada Department of Wildlife (NDOW) were contacted regarding ecological study needs for the project, with the BLM as the lead federal agency for all permitting. This document addresses the Gila monster, common chuckwalla, and desert big horn sheep. Impacts to the federally-listed desert tortoise are addressed in a biological assessment, and impacts to birds and bats are addressed in an avian and bat protection plan. This document summarizes the wildlife study reports completed for the Project (Section 2) and evaluates risk to wildlife in the context of the Project (Section 3). The plan then addresses proposed measures to avoid, minimize and mitigate adverse effects on wildlife resources from Project construction and operation (Section 4). In support of implementation for those measures, the plan provides a post-construction wildlife reporting system (Section 5).

1.2 PROJECT DESCRIPTION

The Project area for the Searchlight Wind Project lies to the north of the Newberry Mountain Range and south of the Eldorado Mountain Range in southern Clark County, Nevada. It is situated approximately 1.5 miles west of Lake Mead National Recreation Area, 60 miles southeast of Las Vegas and 40 miles north of Laughlin, Nevada. Specifically, the Project area for the Searchlight Wind Project encompasses lands approximately 0.5 miles northeast to 3 miles southeast of the town of Searchlight. The Project area encompasses 8,400 acres east of I-95 and is located on undeveloped BLM land with private holdings, mainly in the form of mine claims, within the Project boundary.

The Project has been planned to include 87 2.5 MW turbines (Figure 2). Turbine configuration takes advantage of local terrain and is located primarily along hill- and ridge-tops within the Project area, configured to maximize access to the wind resource in the area while minimizing impacts to wildlife. In addition to the turbines, the facility will include a system of Project access roads (to provide ingress, egress and traffic circulation), an electrical collection system, a substation, a transmission connection, an operations and maintenance (O&M) building and 5 permanent meteorological (met) towers (Figure 2). The total area affected by development will be up to approximately 382 acres (Table 1).

Table 1. Approximate Acreages Impacted by Development of the Project

Project Feature	Total Acres of New Habitat Disturbance (acres)	Approximate Temporary Construction Disturbance (acres)[1/]	Approximate Permanent Construction Disturbance (acres)
Turbine pads	69.2	66	3.2
New and upgraded project roads and crane pads[2/]	253.0	111.4	141.6
Operations and maintenance facility	6.5	1.5	5.0
Equipment storage and construction laydown areas[3/]	28.3	28.3	0
Overhead transmission line right-of-way	16.5	16.5	0
Substations	7.0	5.0	2.0
Batch plant	1.0	1.0	0
Meteorological towers	0.01	0	0.01
Western's switching station	7	2.5	3.5
Total Estimated Impacts	**388.5**	**232.2**	**155.3**

1/ Temporary construction impacts are in addition to permanent impacts.
2/ Restoration of roadsides.
3/ Includes temporary office trailers and crane assembly areas.

1.3 ENVIRONMENTAL SETTING

The Project area is located in the Mojave Basin and Range ecoregion in extreme southern Nevada. Topographic dimensions of the Project area vary greatly with flats, washes, valleys, and steep mountains/hills present with elevations ranging from 2,240 to 4,327 feet above mean sea level. Caliche formations are present throughout the Project area with creosote bush scrub and Joshua tree woodland as the predominant plant communities. Topographical variation is highest in the northern portion of the Project area while the southwestern portion lies predominantly in the valley floor. Dry washes exist throughout the Project area.

1.4 WIND ENERGY AND TERRESTRIAL WILDLIFE

Wind energy provides a clean, renewable energy source that is in high demand. As wind power becomes more common, the need to address potential environmental impacts has increased. In general, the impact of a wind energy facility on terrestrial wildlife is expected to be similar to other large-scale development projects and would include both direct and indirect impacts. Direct impacts may include harassment, injury, and mortality during construction and maintenance activities (e.g. noise disturbance, collapsed burrows, vehicular collision with wildlife), while indirect impacts may include loss, fragmentation, and degradation of habitat during construction, and disturbance during construction and operation activities. These impacts can occur over both the short- and long-term, and may add to the cumulative impacts occurring within a particular region. Site-specific mitigation (through Project design and impact minimization measures), monitoring, and adaptive management are essential to ensure that wind energy can be developed while avoiding or minimizing adverse impacts to terrestrial wildlife. As currently recommended in the Draft USFWS Land-based Wind Energy Guidelines (2011a), Duke has performed a preliminary landscape-scale evaluation of the Project site (Tier 1), a broad characterization of the site (Tier 2), and site-specific pre-construction monitoring and risk assessments (Tier 3) in order to minimize negative impacts to wildlife.

1.5 REGULATORY FRAMEWORK

Terrestrial wildlife occurring in the vicinity of the Project area include four species receiving state and federal protection, namely desert tortoise *(Gopherus agassizil)*, banded Gila monster (*Heloderma suspectum*), common chuckwalla (*Sauromalus ater*), and desert bighorn sheep (*Ovis canadensis nelsoni*). The regulations associated with these species are detailed below.

1.5.1 Endangered Species Act

On April 2, 1990, the U.S. Fish and Wildlife Service (USFWS) listed the Mojave population of the desert tortoise to be a threatened species pursuant to the Endangered Species Act of 1973, as amended (55 FR 12178 12191). The Desert Tortoise (Mojave Population) Recovery Plan was released in June of 1994 (USFWS 1994) and was later revised (USFWS 2011b). The Recovery Plan identifies six evolutionarily significant units of the desert tortoise in the Mojave Desert region and outlines 4.1 million acres of designated critical habitat (USFWS 2011b). This designation includes primarily federal lands in southwestern Utah, northwestern Arizona, southern Nevada, and southern California. In Nevada, the critical habitat designation totals 1,221,341 acres in Clark and Lincoln Counties. Of this amount, 988,600 acres are on BLM-managed lands.

The desert tortoise is listed by the BLM as a Nevada Special Status Species that is federally listed as Threatened. As a result, a Biological Assessment has been developed for the desert tortoise for this Project. Details of Project risk to the desert tortoise, conservation measures, and mitigation options will be fully detailed within the Biological Opinion.

1.5.2 BLM Special Status Species

In Nevada, the BLM has implemented policies for special-status species found on BLM-managed lands. BLM's list of special-status species includes the following three categories: (1) federally listed as Threatened or Endangered, Proposed and Candidate species; (2) Nevada State Protected species; and (3) Nevada BLM Sensitive Species. BLM Sensitive Species are species for which population viability is a concern; they are managed by the BLM to "ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed;" these species are afforded the same level of protection as federal Candidate species.

The banded Gila monster, common chuckwalla and desert bighorn sheep are species occurring in the Project area listed as Nevada BLM Sensitive Species.

1.5.3 Nevada Codes

Under Nevada law and regulation, any wildlife receiving the distinction of fully protected species may not be captured, removed or destroyed at any time except with special permit as provided under Nevada Revised Statutes (NRS) 503.584-503.589 and Nevada Administrative Code (NAC) 503.093. Section 503.093 indicates that protected species include wildlife species that are classified as sensitive, threatened or endangered by NDOW and that an "appropriate license, permit or authorization required to hunt, take or possess protected wildlife; (NRS 501.105**,** 501.181)" is necessary. Both the desert tortoise and banded Gila monster are considered protected under NAC 503.080 and NRS 501, with the desert tortoise further classified as Federally Threatened. Additionally, under Nevada Revised Statutes (501.376), it is

unlawful to intentionally take, kill or possess large game species such as bighorn sheep without appropriate authorization.

The desert tortoise, banded Gila monster, common chuckwalla, and desert bighorn sheep (or Nelson bighorn sheep) are considered Species of Conservation Priority under the Nevada Wildlife Action Plan (Abele *et al.* 2006), which is being implemented by NDOW.

1.5.4 Clark County

The desert tortoise is a covered species under the Clark County Multiple Species Habitat Conservation Plan (MSHCP; RECON 2000). The banded Gila monster is a high priority evaluation species.

2 MONITORING AND SURVEYING TO DATE

2.1 TERRESTRIAL WILDLIFE

Pre-construction presence/absence surveys within the Project area were conducted for banded Gila monster, common chuckwalla, and desert bighorn sheep in order to determine the use and distribution of these species (if present) within the Project area (Appendix A). Surveys were conducted from April 3 – May 16, 2011 within a survey corridor corresponding to areas of potential development within the Project area, as well as within exterior belt transects which extended various distances outward from the corridor (200, 400, 600 feet). Belt transect-oriented visual searches for presence or sign (e.g., scat or carcasses) of the focal species were performed within the survey corridor, with sightings documented with handheld Global Positioning System (GPS) units and photographs. Observations made outside of the either the survey corridor or survey time period, or both, were recorded as incidental observations. An additional desktop analysis was performed to identify and evaluate areas of suitable desert bighorn sheep habitat within the Project area due to their relatively larger home range.

2.1.1 Banded Gila Monster

No banded Gila monsters were observed directly, nor was evidence of their presence detected. However, Gila monsters tend to be secretive and spend greater than 95 percent of their lives underground (NDOW 2007). These behaviors make this species extremely difficult to observe.

2.1.2 Common Chuckwalla

Twenty live common chuckwalla and 54 observations of scat were documented during surveys (Figure 3).

2.1.3 Desert Bighorn Sheep

One observation of four desert bighorn sheep, divided between two groups, was documented. Additionally, one observation of unidentified ungulate scat presumed to be desert bighorn sheep scat (Figure 4) was documented.

3 RISK ASSESSMENT

Potential impacts to terrestrial wildlife from the Project include direct and indirect mortality (e.g. vehicular collisions, destruction of nest sites, increased predation), disturbance from construction and operation activities, and habitat loss and fragmentation. No publicly available studies have investigated the potential impacts of wind energy development on banded Gila monster, common chuckwalla, or desert bighorn sheep. Thus, assessments of risk are based primarily on results of site-specific surveys and inferences from studies of similar species or other forms of energy development, as available.

3.1 BANDED GILA MONSTER

The primary risk to Gila monsters is collisions with vehicles and habitat loss. Few, if any, collisions with vehicles would be expected, and disturbance should be minimal because the crepuscular activity of the Gila monster is unlikely to coincide with the timing of construction and operations activity. Both construction and operations activity will take place during daylight working hours. The majority vehicular use will fall outside the daily active periods for this species. During seasonal periods of high activity (April-June), biological monitors necessary for desert tortoise monitoring will also monitor for Gila monster.

Preferential habitat includes washes, rocky crevices, and creosote scrub brush lands, all present within the Project area, thus habitat loss will likely occur during construction. The total new habitat disturbance due to the Project is limited to 388.5 acres of disturbance, of which 153.5 would be permanent (Table 1) with much of the development occurring outside of washes and limited development occurring within the areas of lower elevation creosote scrub. Thus, only a small amount of viable Gila monster habitat would be expected to be disturbed or lost. Impacts of the Project to Gila monsters are expected to be low due to a lack of detections of Gila monster or Gila monster sign within the Project area, although preferred habitat is present, and absence of the species cannot be confirmed through the survey methods used (Appendix A). Further, the general avoidance and minimization measures described in section 4.1, and the Gila monster specific avoidance and minimization measures described in section 4.2 will reduce impacts.

3.2 COMMON CHUCKWALLA

The primary risk to common chuckwallas is collisions with vehicles, disturbance during construction, and habitat loss. Limited chuckwalla habitat exists within range of proposed roads, suggesting low risk for collisions with construction and maintenance vehicles. Although materials and equipment left behind following construction and maintenance activities may attract predators such as common ravens and coyotes, the implementation of a trash abatement plan and other Best Management Practices (BMPs) will limit draws for opportunistic predators. Surface disturbance in July and August may impact chuckwalla nests, but likely nesting areas will be visually surveyed by biological monitors during desert tortoise surveys, marked as sensitive areas prior to disturbance and avoided to the extent practicable. Observations of chuckwalla and sign were spatially clustered and largely limited to habitat in the northeast section of the Project, minimizing both contact with Project features and disturbance due to Project activities (Appendix A). Lastly, habitat loss will be minimal because a limited amount of chuckwalla habitat is present within the Project footprint. Although the Project is sited within the core of the common chuckwalla range, and numerous detections of chuckwalla and sign were

made within the Project (Figure 3), impacts due to the Project are expected to be low. Further, the general avoidance and minimization measures described in section 4.1, and the common chuckwalla specific avoidance and minimization measures described in section 4.2 will reduce impacts.

3.3 DESERT BIGHORN SHEEP

The primary risk to desert bighorn sheep is collisions with vehicles, disturbance during construction and operation, and habitat loss.

3.3.1 Vehicle Collisions

Roads within the Project area pose risk of collision with project and public vehicles (if open to public access) to desert bighorn sheep. A total of 2.7 miles of new roads and 0.3 miles of upgraded existing roads are currently proposed within desert bighorn sheep habitat identified within and bordering the Project area (Figure 4). However, additional roads occur in areas that are not identified as bighorn sheep habitat but which individuals might cross when moving between habitat areas. The general location of the project area is situated within a movement corridor utilized by desert bighorn sheep passing between the Eldorado Mountains/Ireteba Peaks and Newberry Mountains from late-October to mid-May (Appendix A, Pat Cummings, pers. comm.). Limited suitable habitat within the Project area offers rams potential escape terrain while utilizing this corridor. The vicinity of the Project area supports low-density herds of desert bighorn sheep, and there were few observations of desert bighorn sheep and scat during surveys (Appendix A), suggesting low rates of use of the Project area by this species. The low rates of use and relatively small amount of roads (all dead-end) proposed in suitable habitat indicate that risk of mortality due to collision with vehicles would be low during both construction and operation. Additionally, construction and maintenance traffic would be minimized and 25 mph vehicular speed limits to minimize collision risk. Further, the general avoidance and minimization measures described in section 4.1, and the desert bighorn sheep specific avoidance and minimization measures described in section 4.2 will reduce impacts.

3.3.2 Disturbance

Disturbance is expected to be the most serious of the potential impacts of the Project to desert bighorn sheep. There is evidence that human disturbance can alter habitat use and activity patterns of bighorn sheep (e.g. Miller and Smith 1985, King and Workman 1986, Etchberger et al. 1989, Papouchis et al 2000, Thompson et al. 2007), although the response to disturbance varies among individuals and with degree of previous exposure to human contact (Leslie and Douglas 1980). Given the limited use of the Project area by desert bighorn sheep, disturbance will likely be limited to rams passing through the area from late October to mid-May, and may cause disruption of the movement of sheep between Eldorado and Newberry Mountains during construction. However, evidence of habituation to human activities such as hiking (e.g. Hicks and Elder 1979), roads (Horesji 1976 cited in Thompson et al. 2007), construction (Leslie and Douglas 1980, Campbell and Remington 1981) and aircraft (Krausman et al. 1998), suggest that sheep will habituate to the Project during operation, and thus would be expected to incur a low level of disturbance impact in the years subsequent to construction of the Project, and population connectivity would be maintained. Further, the general avoidance and minimization measures described in section 4.1, and the desert bighorn

sheep specific avoidance and minimization measures described in section 4.2 will reduce impacts.

3.3.3 Habitat Loss

Construction of roads and turbines would result in the loss of a relatively small amount of desert bighorn sheep habitat. Approximately 416 acres of identified desert bighorn sheep habitat falls within the survey corridor, with little of this considered suitable escape terrain (Appendix A). The actual acres of habitat loss would be less than this value because the survey corridor was larger than the actual Project disturbance footprint (Table 1), and some of the habitat would be re-vegetated after construction is complete. Thus risk of desert bighorn sheep habitat loss due to the Project is expected to be low. Further, the general avoidance and minimization measures described in section 4.1, and the desert bighorn sheep specific avoidance and minimization measures described in section 4.2 will reduce impacts.

4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

4.1 GENERAL AVOIDANCE AND MINIZATION MEASURES

Searchlight Wind and agency-proposed avoidance and minimization measures are outlined in the following sections and further documented in the draft environmental impact statement.

Road construction, placement of turbine foundations, and all clearing of vegetation will occur during daylight hours. The main access road will be improved by grading and graveling. Access roads and turbine locations within the main body of the wind project area will be cleared, and construction trailers will be placed on-site. During the construction period, heavy trucks, light trucks, and other construction equipment will regularly travel the main access road, with dispersed travel on interior access roads. Construction vehicle trips will be reduced by requiring all craft workers to park their personal vehicles at a central location in the project area. During the operational phase of the project, traffic volume will be minimal, consisting only of the routine trips by technicians to check and maintain equipment, as turbines are unlikely to be visited daily if operating correctly. All construction and operations personnel will be made aware of the seasonal periods of high activity for both the chuckwalla and the Gila monster through the Worker Environmental Awareness Program (WEAP). A summary of species likely to benefit from construction- and operations-related categories of mitigation measures is shown in Table 2.

Table 2. Species Groups that would Benefit from Searchlight Wind Project Construction and Operation Avoidance and Minimization Measures

Avoidance and Minimization Measures	Gila monster	Common chuckwalla	Bighorn sheep
Minimize disturbance impacts	X	X	X
Avoid attracting wildlife	X	X	
Trash abatement	X	X	
Speed limits	X	X	X
Worker environmental awareness	X	X	X
Minimize wildlife potential	X	X	X

Avoidance and Minimization Measures	Gila monster	Common chuckwalla	Bighorn sheep
Minimize erosion and runoff	X	X	
Invasive weed control	X	X	X

Minimize Disturbance Impacts:

- Develop construction corridors to account for both temporary and permanent impacts and restrict work to inside flagged areas. Use of construction corridors will reduce impacts to native vegetation.
- Soil from weed-free areas will be used for reclamation.
- Equipment and vehicle travel will be limited to existing roads or construction corridors during construction. Construction traffic, parking and laydown areas will occur within previously disturbed lands to the extent feasible.
- Any vegetation that is removed (not including cacti or yucca) will leave the underground roots of woody plants intact. The grubbing will skim the surface of the ground to crush or slice off the aboveground portions of vegetation, leaving the root crowns intact. This will allow for rapid regeneration of woody plant species.

Avoid Attracting Wildlife:

- Removal of rock piles post-construction.
- Maintain turbine pads so that erosion does not cause openings underneath transformer to become available habitat.
- On-site open water sources that serve as wildlife attractants will not be created or maintained.

Trash Abatement:

- All trash and food-related waste will be placed in self-closing containers and removed daily from site. This measure will reduce attraction of opportunistic predators to the project.

Speed Limits:

- Vehicular speed will be limited to 20 miles per hour, 15 mph during high activity seasons for desert tortoise (April-May and September-October), on all Project roads to reduce risk of collision with wildlife. Speed limits could be lowered during the sensitive period for the species in this plan if individuals are observed on Project roads.

Worker Environmental Awareness Program (WEAP):

- A site-specific worker environmental training program will be developed, updated and implemented throughout the construction of the Project.
- All employees and contractors working in the field will be required to attend environmental awareness training sessions prior to working on site. Training will include information regarding sensitive biological resources, restrictions, protection measures,

individual responsibilities associated with the Project, and the consequences of non-compliance.

- Rewards and fines will be used for individual adherence or lack of compliance to the training program.

Marking of Sensitive Areas:

- Sensitive habitat features include nesting locations of the species named in this plan. If areas with sensitive habitat features such as chuckwalla nests are encountered, these areas will be marked to highlight their location to construction crews in order to minimize disturbance in those areas. Areas with sensitive habitat features may include soft, well-drained soil with annual plant vegetation for forage (Brodie, et al. 2003). These areas are likely to be located where rocky mountain slopes come into contact with the beginning of the bajada.

Minimize Wildfire Potential:

- Fire prevention measures will be implemented during construction to minimize wildfire potential.

Minimize Erosion and Runoff:

- A Storm-water Pollution Prevention Plan will be developed to minimize erosion, storm-water runoff and transport of sediment and other contaminants.

Invasive Weed Control:

- A Weed Management Plan will be implemented during the construction of the Project.

4.2 SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES

4.2.1 Banded Gila Monster

In addition to the general avoidance and minimization measures in Section 4.1, measures specific to Gila monsters are provided below.

Construction Phase

- As part of the WEAP, construction site personnel will be given a packet, which includes NDOW's Gila Monster Status, Identification and Reporting Protocol for Observations (NDOW 2007). The packet will also contain information describing the distinguishing features of a banded Gila monster and instructions on distinguishing a banded Gila monster from chuckwallas and banded geckos, as well as information on the protection status of the species and the consequences of a potential bite.
- All sightings of banded Gila monster and circumstances under which it was encountered, will be immediately reported to NDOW using the Gila Monster Reporting Form (Appendix B). Gila Monsters found dead will be preserved in a freezer-safe container or plastic bag and delivered to NDOW as soon as is feasible. When handling dead Gila monsters,

hands shall be kept clear of the lizard's mouth to avoid a reflex-induced, painful and venomous bite.

- Upon finding a Gila monster, all construction activities will be halted in the immediate vicinity of the animal until the animal moves to safety of its own accord, undisturbed.

Operation Phase

- Gila monster encounter protocol, as described in the Design and Construction-Phase Mitigation Measures above will remain in effect for the life of the project.

4.2.2 Common Chuckwalla

In addition to the general avoidance and minimization measures in Section 4.1, measures specific to common chuckwallas are provided below.

Construction Phase

- During construction activities, qualified on-site biologists conducting desert tortoise monitoring will also monitor for chuckwalla and direct construction workers to allow the animal to move to safety of its own accord, undisturbed.
- If construction occurs during the nesting period, on-site desert tortoise monitors will investigate potential chuckwalla nesting habitat (sandy, well-drained soils) in July and August for signs of nests. These areas will be marked as sensitive areas and avoided to the extent practicable during construction to avoid disturbing eggs.

Operation Phase

- No operation phase measures specific to common chuckwalla are proposed.

4.2.3 Desert Bighorn Sheep

In addition to the general avoidance and minimization measures in Section 4.1, measures specific to desert bighorn sheep are provided below.

Construction Phase

- Appropriate fencing will be installed around guy wire anchor points of existing met towers.
- Upon finding bighorn sheep in the area proposed for construction, all construction activities will be halted in the immediate vicinity of the animal until the animal moves to safety of its own accord, undisturbed. If sheep do not move within two hours from areas proposed for construction, Pat Cummings at NDOW (702-486-5127 x3212) will be contacted to determine the appropriate measures to encourage sheep to move from the construction area.

Operation Phase

- Maintenance activities during the peak migration period of rams within the Project area (late-October – mid-May) will be minimized to the extent practicable to reduce risk of collision. If maintenance activities occur, vehicular speed will be reduced below the standard 25 mph limit to 10 mph. This speed reduction serves as road clearing to minimize risk of collision.
- Upon finding bighorn sheep in the area proposed for maintenance, all maintenance activities will be halted in the immediate vicinity of the animal until the animal moves to safety of its own accord, undisturbed. If sheep do not move within two hours from areas proposed for maintenance, Pat Cummings at NDOW (702-486-5127 x3212) will be contacted to determine if the maintenance activities can occur with sheep in the area. It is expected that sheep will habituate during operation of the Project and maintenance will occur in the presence of bighorn sheep.
- Observations of desert bighorn sheep will be reported using the Incidental Wildlife Reporting System for the life of the Project.

4.3 MITIGATION

Although the impacts to species will be avoided and minimized to the extent practicable through measures listed in section 4.1 and 4.2, some limited impacts might occur. To account for these impacts, Searchlight Wind will provide mitigation.

4.3.1 Banded Gila Monster

Searchlight Wind will contribute $5,000 to the Gila Monster Fund. The contribution will be used for mitigating Project impacts to this special status lizard. Contributions to the Gila Monster Fund will provide support dedicated to applied management investigations and actions facilitating high priority conservation needs for the Gila monster in Nevada.

4.3.2 Common Chuckwalla

None proposed.

4.3.3 Desert Bighorn Sheep

Searchlight Wind will contribute $5,000 to a Desert Bighorn Sheep Wildlife Research Fund (Research Fund). The Research Fund will be dedicated to funding applied management efforts addressing conservation challenges for bighorn sheep populations which are facing rapid, regional landscape level changes. These investigative efforts are necessary for developing and implementing regional management strategies in Southern Nevada for ensuring the long-term viability of regional desert bighorn sheep populations. The $5,000 contribution will assist in funding research and mitigation for this and other projects in the area. Initially, money from the Research Fund will contribute to efforts addressing management questions about bighorn sheep populations utilizing the El Dorado mountain migration corridor relative to the development of the existing landscape.

Searchlight Wind will fund the rental of one helicopter (no more than 6 hours) for survey purposes, at the soonest appropriate seasonal time interval after the commencement of implementation of the Project to assist with baseline movement studies of area herds. Instead of implementation of this measure, NDOW may choose to have Duke pay the equivalent amount of money used for the measure into the Research Fund. If a helicopter is funded for survey

purposes, NDOW will provide Duke the results of the survey within 4 weeks to address the movement of sheep through or in the vicinity of the project area.

5 ADDITIONAL MONITORING

5.1 INCIDENTAL WILDLIFE REPORTING SYSTEM

In addition to desert tortoise monitoring as determined in the biological opinion, Searchlight Wind will implement an Incidental Wildlife Report System (IWRS) that will be executed by site personnel for the life of the project. The IWRS has three main functions:

- To provide a means of recording and reporting information on incidental observations of banded Gila monster and desert bighorn sheep within the Project;
- To keep site personnel mindful of wildlife interactions; and

  To provide a standard set of instructions for Project operations and maintenance personnel to follow in response to wildlife observations associated with the Project.

The common chuckwalla is excluded from the IWRS because of its non-descript features, the likelihood that it will be confused with other lizards,

This program will be led by the site manager. Site personnel will be trained to follow the IWRS procedures and complete the appropriate reporting forms. Materials identifying sensitive species will be provided to the site staff. The IWRS will include Incidental Wildlife Reporting Forms (Appendix B) for site personnel to record incidental observations of banded Gila monster and desert bighorn sheep during routine site activities, and training will be provided as to how to report an incidental observation using the forms.

If a banded Gila monster (live or injured) is observed during construction or operation activities, site personnel will follow NDOW's Gila Monster Status, Identification and Reporting Protocol for Observations (2007). This includes completion of the Gila Monster Reporting Form (Appendix B) which was developed to comply with NDOW's reporting protocol.

If a desert bighorn sheep (live or injured due to Project activity) is observed during construction or operation activities, the Incidental Wildlife Reporting Form (Appendix B) will be completed and photos taken by site personnel and submitted to the site manager at the end of the day. If the individual is injured, and the injury is thought to be a result of the Project, the site manager will contact Pat Cummings at NDOW (702-486-5127 x3212).

Monitoring for wildlife mortalities will be associated with post-construction mortality monitoring studies. These studies will be addressed in the Searchlight Wind Energy Project Avian and Bat Protection Plan.

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FIGURES

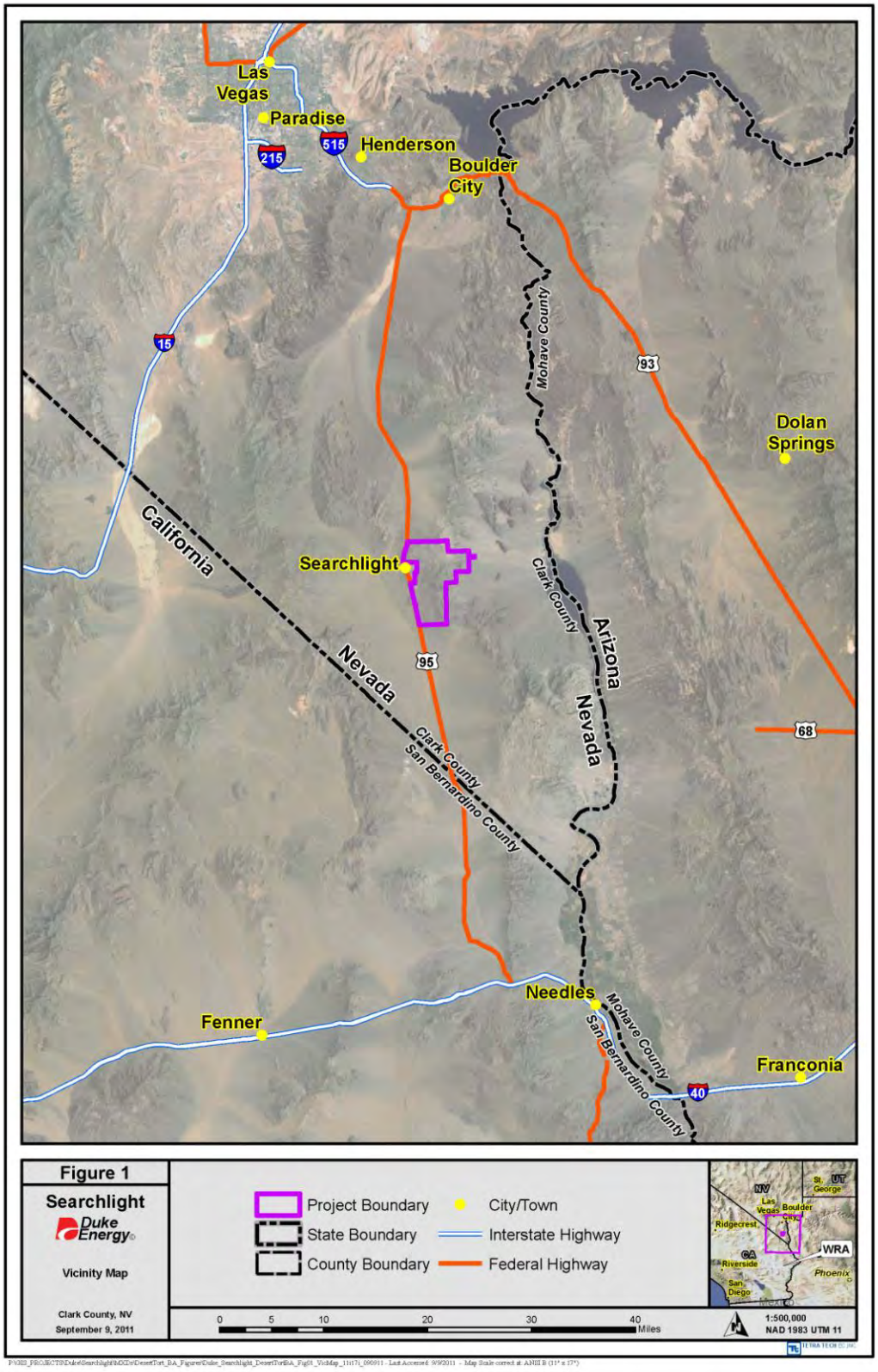

Figure 1. Project Vicinity Map

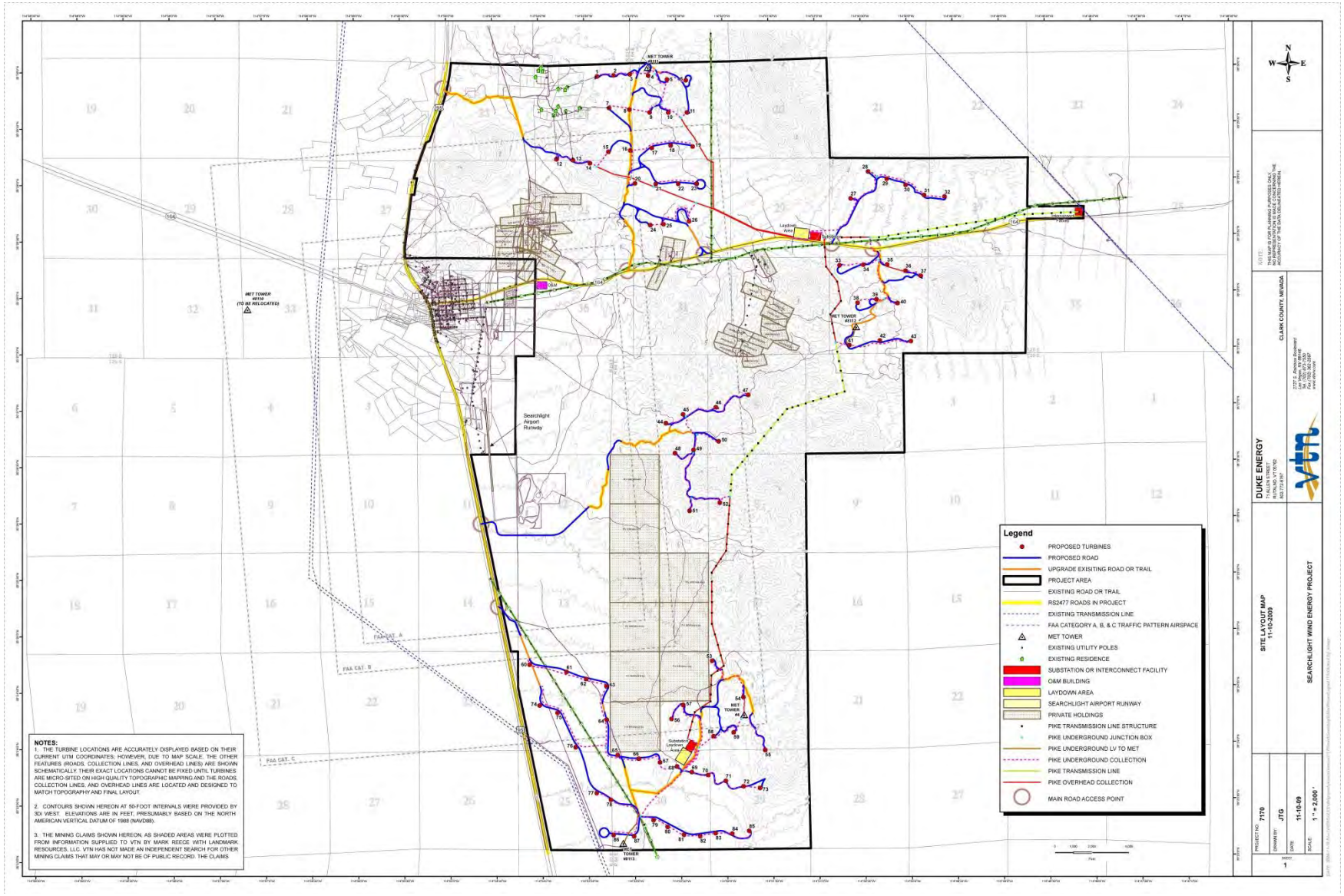

Figure 2. Project Layout

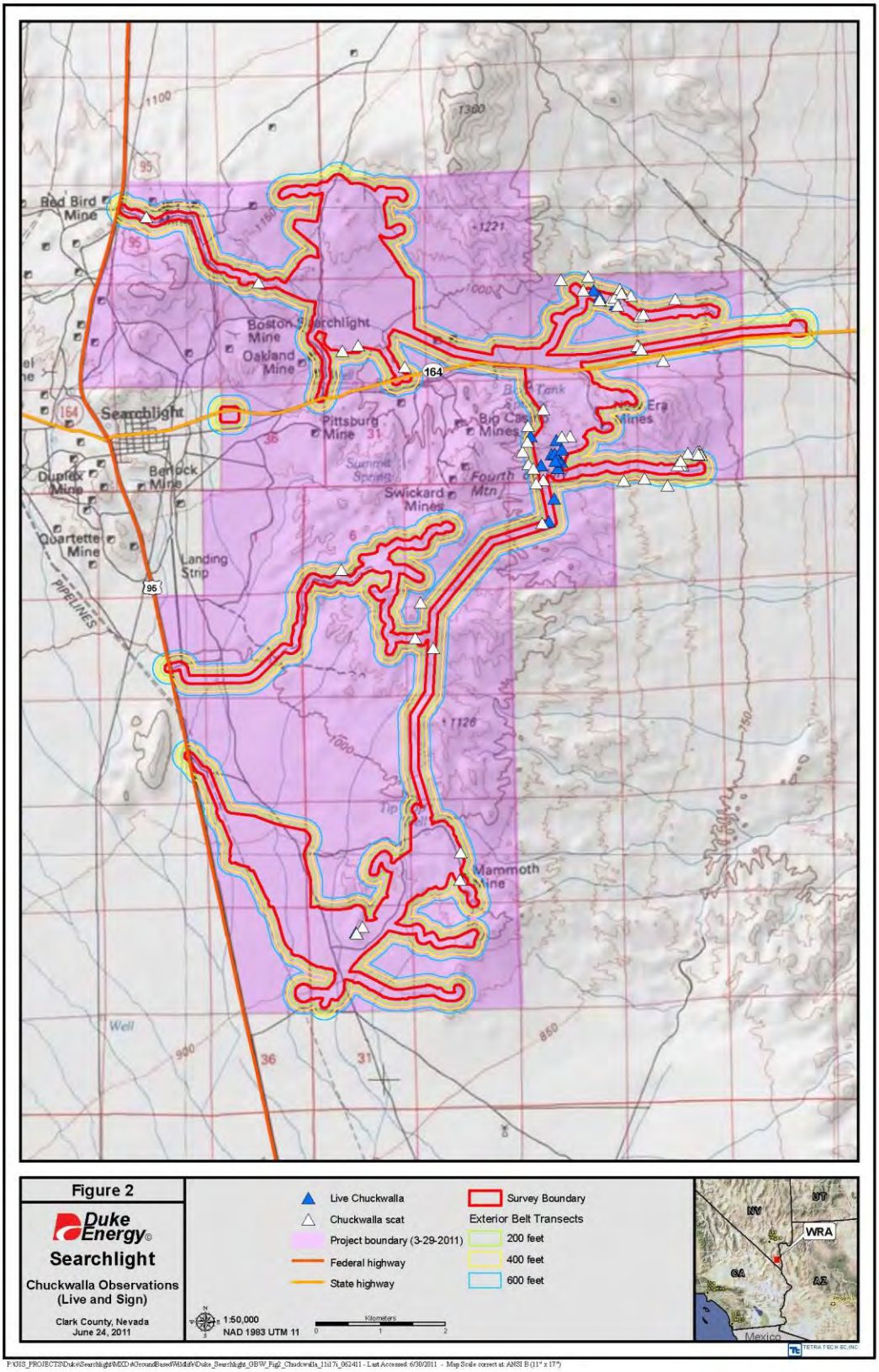

Figure 3. Observations of Chuckwalla and Sign

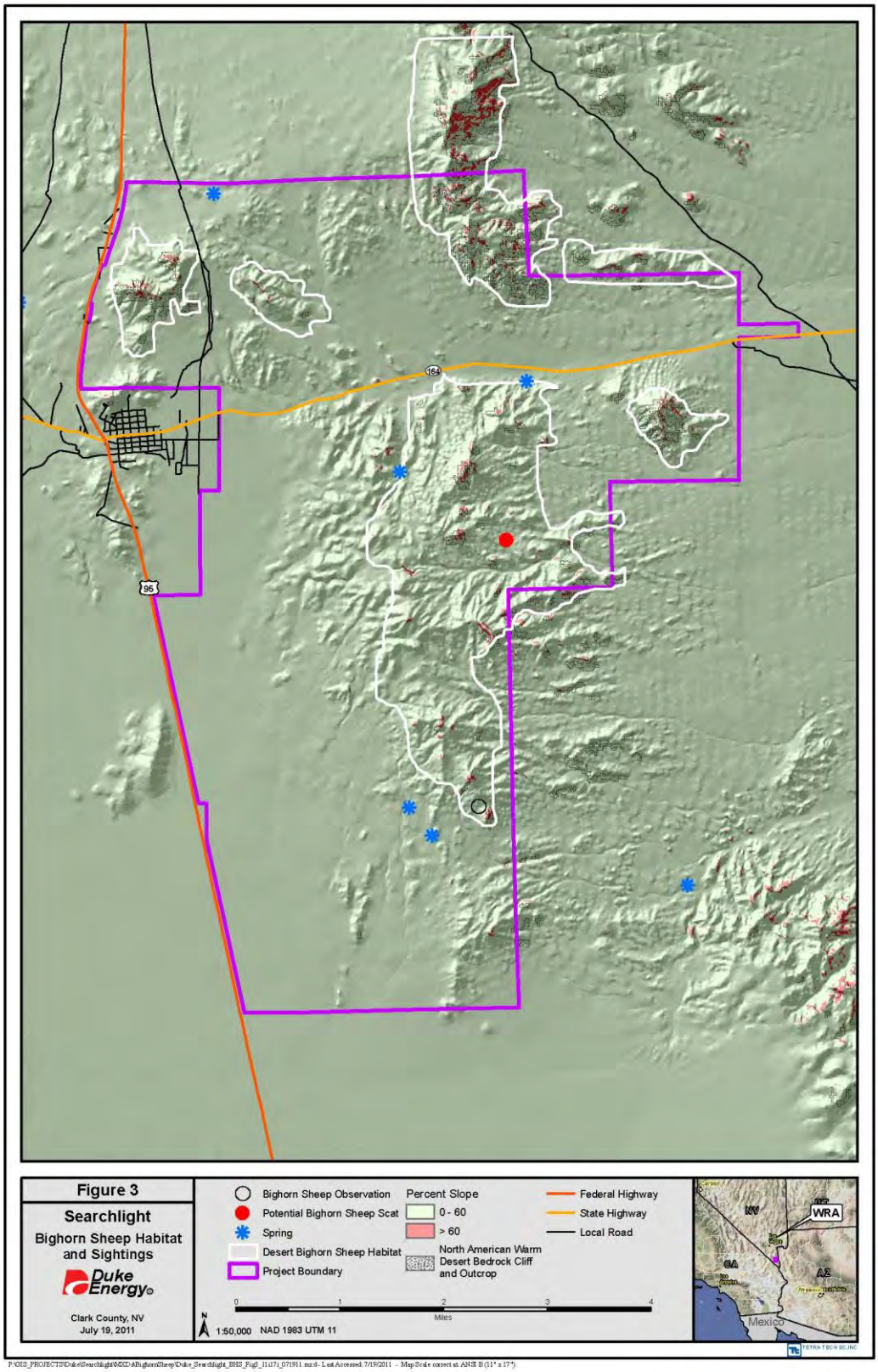

Figure 4. Observations of Bighorn Sheep and Sign and Potential Habitat

APPENDIX A

Terrestrial Wildlife Survey Report

APPENDIX B

Incidental Wildlife Reporting Forms

Gila Monster Reporting Form

OBSERVATION DETAILS		
Date: / /	Observer:	Phone:
Organization:	Email:	
Type of observation: Live and uninjured Injured Carcass (circle one)		
Person notified at NDOW:		Date and time:
Landscape context photo no.:	Overhead body shot photo no.:	
Overhead head close-up photo no.:		
Found in harm's way: Yes No (circle one)	Action taken: Yes No (circle one)	
Description of actions taken: (e.g., captured and detained, taken to vet, carcass taken to NDOW)		
Details or behavior of animal:		
IF CAPTURED		
Description of containment container:		
Time of capture:	Time NDOW staff arrived:	
Circumstances: Biological survey Construction Maintenance Other-explain (circle one)		
Notes:		
IF TAKEN TO VETERINARIAN		
Description of injuries:		
Name of veterinarian:		Phone:
Name of clinic:		
Address of clinic:		
IF CARCASS FOUND		
Carcass frozen: Yes No (circle one)	Date transported to NDOW:	
LOCATION OF OBSERVATION/CAPTURE LOCATION		
Nearest Landmark: Turbine Pole Milemarker Sign Other (circle one)		Details:
Distance from Landmark:	Direction from Landmark:	
UTM (NAD 83 Zone 11) N:	E:	
ENVIRONMENTAL CONDITION		
Habitat: Desert wash Cliff Spring Riparian area Desert scrub Road (circle one)		
Substrate: Scree Sand Gravel Rock Dirt Pavement (circle all that apply)		
Vegetation: Riparian Shrub-scrub Grasses (circle all that apply)		
Slope:_____°	Aspect: facing N NE E SE S SW W NW (circle one)	
COMMENTS:		

Form to be submitted to NDOW office, Southern Region, 4747 W. Vegas Drive, Las Vegas, NV 89108
Ph: 702 486-5127 Fax: 702 486-5133 Photos may be emailed to ctomlinson@ndow.org

Incidental Wildlife Reporting Form

OBSERVATION DETAILS

Date: / /	Observer:	Phone:
Organization:	Email:	
Type of observation: Live Observation Wildlife Incident (circle one)		
Photo No.		
Who was notified, and when?		
Actions Taken (e.g., left in place, taken to rehab):		
Details or Behavior of Animal:		

WILDLIFE INCIDENT DETAILS

Injured likely due to Project? Yes No (circle one)	Killed likely due to Project? Yes No (circle one)
Description of incident:	

LOCATION OF OBSERVATION/INCIDENT

Nearest Landmark: Turbine Pole Milemarker Sign Other (circle one)		Details:
Distance from Landmark:		Direction from Landmark:
UTM N:	E:	Datum:
Found: On Road Off Road (circle one)		Location Remarks:

IDENTIFICATION

Species: Chuckwalla Desert Bighorn Sheep Other-explain (circle one)	
Sex: Male Female Unknown (circle one)	Age: Adult Juvenile Unknown (circle one)
Is Animal Tagged? Yes No (circle one)	Notes:

ENVIRONMENTAL CONDITION

Habitat: Desert wash Cliff Spring Riparian area Desert scrub Road (circle one)	
Substrate: Scree Sand Gravel Rock Dirt Pavement (circle all that apply)	
Vegetation: Riparian Shrub-scrub Grasses (circle all that apply)	
Slope:_____°	Aspect: facing N NE E SE S SW W NW (circle one)
COMMENTS:	

Appendix B-4: Bird and Bat Conservation Strategy

Searchlight Wind Energy Project
Bird and Bat Conservation Strategy

Prepared for:

Duke Energy Renewables

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November 2012

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1.0 INTRODUCTION

1.1 Duke Energy Renewables' Corporate Policy

Duke Energy Renewables and its subsidiary companies, including Searchlight Wind Energy LLC, are committed to siting, constructing, operating, and decommissioning their facilities in an environmentally responsible and sustainable manner. This environmental responsibility includes conserving and minimizing impacts to natural resources, including avian and bat species and the habitats they use. This Bird and Bat Conservation Strategy (BBCS) has been prepared according to Duke Energy Renewables programmatic approach and the USFWS wind energy land-based guidelines (USFWS 2012); and is considered to be a living document that will be updated periodically as new information becomes available and subsequent "Tiers" as outlined in the Wind Energy Guidelines are completed. This approach allows new information on risk, monitoring, or adaptive management to be incorporated so that the BBCS is accurate and uses the best information for decision making.

1.2 Statement of Purpose

While wind power projects or "wind farms," such as the Searchlight Wind Energy Project (Project), utilize a renewable-energy resource (wind), there are potential avian and bat impacts resulting from their construction and operation. The following site-specific Bird and Bat Conservation Strategy (BBCS) outlines various processes that Duke Energy Renewables has and/or will employ to: 1) comply with all state and federal avian and bat conservation and protection laws and regulations at the Project; 2) to ensure that any impacts to avian and bat resources are identified, quantified, and analyzed; and 3) implement various conservation, avoidance, minimization, and mitigation measures to address any impacts that result from the operation of the Project.

Federal laws and regulations protect the majority of birds found in and around the Project site. Interactions of birds with generating facilities (including wind turbines, transmission and distribution lines, substations, and other associated structures and equipment) are potentially harmful or fatal to birds. In addition, bird interactions can result in outages, which in turn could lead to grass and forest fires, raising concerns by employees, resource agencies, and the public.

Generating facilities also have the potential to impact bats. Significant impacts on bats may raise concerns by employees, resource agencies, and the public. Therefore impacts on birds, bats, and other wildlife that occur as a result of Duke Energy Renewable projects are important to Duke Energy from both a regulatory priority, and natural resource conservation priority.

2.0 BACKGROUND AND DESCRIPTION OF THE PROJECT

Searchlight Wind Energy, LLC (Searchlight Wind), a wholly-owned subsidiary of Duke Energy Renewables, received a temporary right-of-way (ROW) grant from the Bureau of Land Management (BLM) in July 2007 to develop the Searchlight Wind Energy Project on portions of

public land in southern Clark County, Nevada. The Project as currently proposed would be an approximately 220 megawatt (MW) wind energy facility (Figure 1). The purpose of the Project is to develop, own and operate a wind conversion facility that will contribute to Nevada's Renewable Portfolio Standards for electricity generation. Searchlight Wind Energy, LLC has contacted the BLM, Nevada Department of Wildlife (NDOW), and the USFWS regarding ecological study needs for the Project (Table 1).

The Project area lies to the north of the Newberry Mountain Range and south of the Eldorado Mountain Range in southern Clark County, Nevada (Figure 1). It is situated approximately 2.4 kilometers (km; 1.5 miles) west of Lake Mead National Recreation Area, 97 km (60 miles) southeast of Las Vegas and 64 km (40 miles) north of Laughlin, Nevada. Specifically, the Project area for the Searchlight Wind Energy Project encompasses lands approximately 0.8 km (0.5 miles) northeast to 4.8 km (3 miles) southeast of the town of Searchlight. The Project area encompasses 3,399 hectares (8,400 acres) east of I-95 and is located on undeveloped BLM land interspersed with private holdings, most of which are in the form of mine claims.

The Project area is located in the Mojave Basin and Range ecoregion in extreme southern Nevada (Bryce et al. 2003). Caliche formations are present throughout the Project area with creosote bush scrub and Joshua tree woodland as the predominant plant communities (Bryce et al. 2003). Topography varies greatly within the Project area, with flats, washes, valleys, and steep mountains/hills present at elevations ranging from 683 – 1319 m (2,240 to 4,327 feet) above mean sea level. Topographical variation is highest in the northern portion of the Project area while the southwestern portion lies predominantly within the valley floor. Dry washes exist throughout the Project area.

The Project has been planned to include 87 wind turbines generators (WTGs; Figure 2) with the anticipated turbine model being the Siemens 2.5 MW turbine which has a hub height of 80 meters (m; 262 feet) and 101 m (331 feet) rotor diameter, producing a rotor-swept area (RSA) occurring between 30 and 130 m (98 – 427 feet) above ground. Turbine configuration takes advantage of local terrain and is located primarily along hill- and ridge-tops within the Project area, configured to maximize access to the wind resource in the area while minimizing impacts to wildlife. In addition to the turbines, the facility will include access roads, an electrical collection system, a substation, a transmission connection, an operations and maintenance (O&M) building and 5 permanent meteorological (met) towers (Figure 2). The total area affected by development will be up to approximately 157 hectares (389 acres; Table 2).

Table 1. Chronology of Agency Coordination for Searchlight Wind Energy Project

Meeting	Type	Parties	Dates
Site visit and discussion of completed, ongoing, and future wildlife studies	In person	Duke, Tetra Tech, BLM, NDOW, O'Farrell Biological	November 5, 2008
Discussion of upcoming 2009 wildlife studies, protocols	Conference call	Duke, Tetra Tech, BLM, NDOW, URS, O'Farrell Biological	March 4, 2009
Discussion of 2009 wildlife study results, upcoming fall studies	In person	Duke, Tetra Tech, BLM, NDOW, URS, O'Farrell Biological	July 24, 2009
Discussion of results of wildlife monitoring, development of mitigation strategies	In person	Duke, Tetra Tech, USFWS, BLM, NDOW	Feb 7, 2011
Discussion of wildlife risk assessment, need for future monitoring, mitigation strategies	In person	Duke, Tetra Tech, USFWS, BLM, NDOW	July 26, 2011

Table 2. Area Affected by Development

Project Feature	Total Acres of New Habitat Disturbance (acres)	Approximate Temporary Construction Disturbance (acres)[1]	Approximate Permanent Construction Disturbance (acres)
Turbine pads	69.2	66	3.2
New and upgraded Project roads and crane pads[2]	253.0	111.4	141.6
Operations and maintenance facility	6.5	1.5	5.0
Equipment storage and construction laydown areas[3]	28.3	28.3	0
Overhead transmission line right-of-way	16.5	16.5	0
Substations	7.0	5.0	2.0
Batch plant	1.0	1.0	0
Meteorological towers	0.01	0	0.01
Western's switching station	7	2.5	3.5
Total Estimated Impacts	388.5	232.2	155.3

1Temporary construction impacts are in addition to permanent impacts.
2Restoration of roadsides.
3Includes temporary office trailers and crane assembly areas.

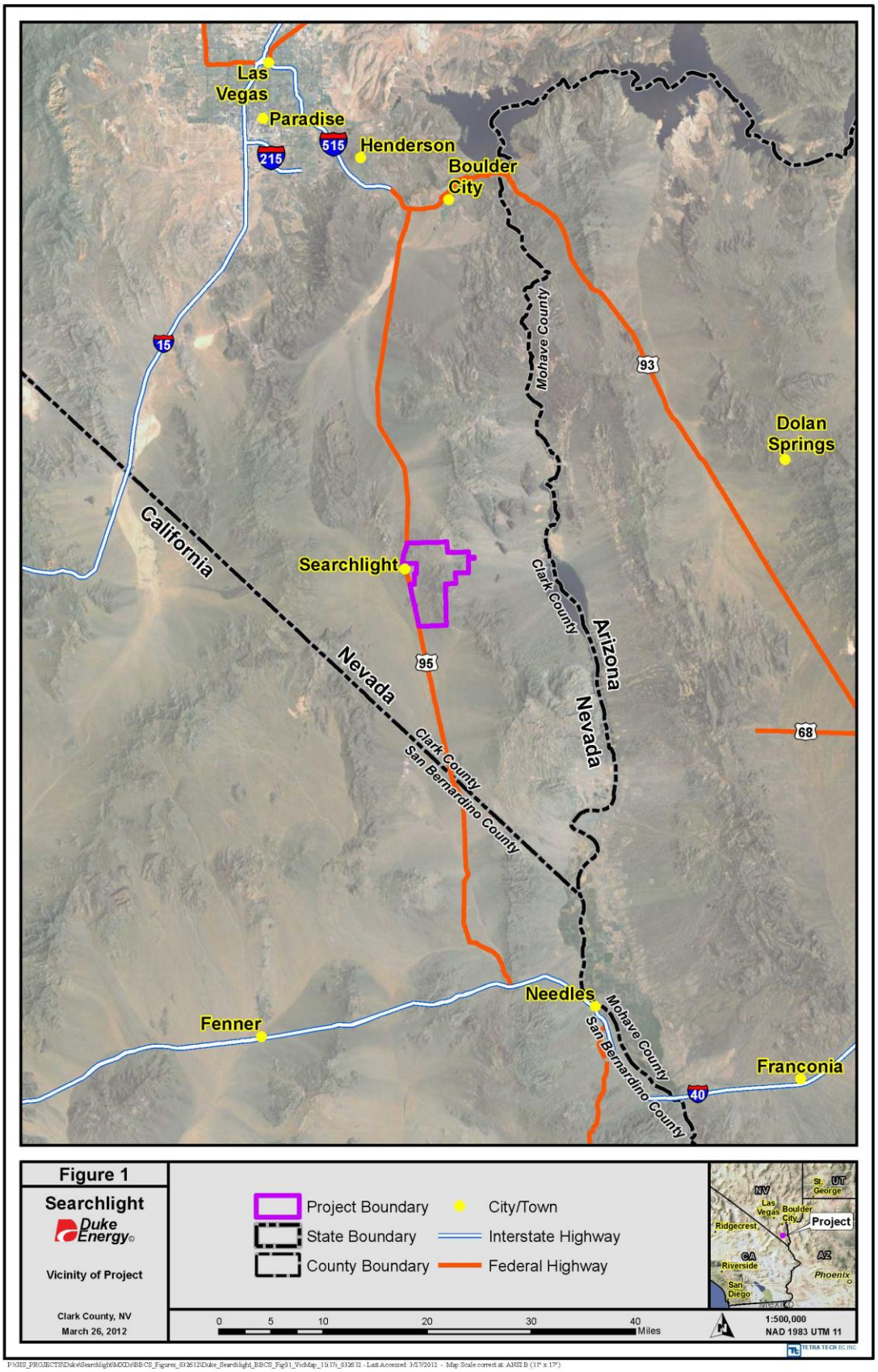


Figure 1. Vicinity of Project

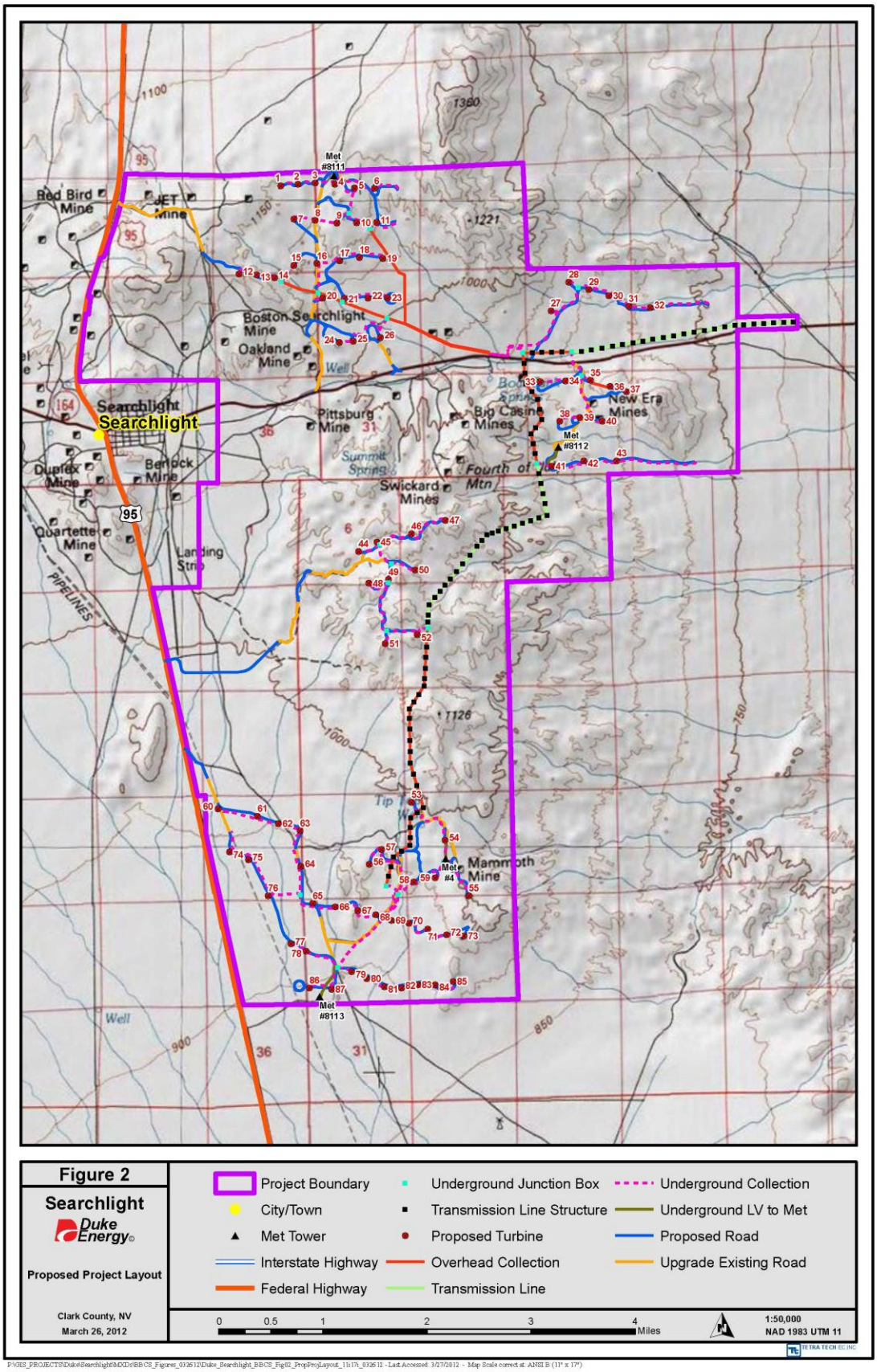


Figure 2. Proposed Project Layout

3.0 PROJECT-SPECIFIC REGULATORY REQUIREMENTS

Bird and bat species are protected under a variety of federal and state laws and regulations. Relative to the Project, these include the federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), BLM Instructional Memorandum 2010-156, and Nevada State Codes. These regulations are described in the following subsections.

3.1 Potential Endangered Species Act-Listed Wildlife Species

The purpose of the ESA is "to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservation of these species." Section 9 of the ESA prohibits "take" of threatened or endangered species, which includes killing, injuring, or harming a listed species or its habitat. Any activity that may result in the "incidental take" of a threatened or endangered species requires a permit issued from the USFWS under Sections 7 or 10 of the ESA. A review of the USFWS endangered, threatened, and candidate species for Nevada (USFWS 2012a) was conducted to identify species listed under the ESA that have the potential to occur in Clark County. Only two threatened or endangered species, Yuma clapper rail (*Rallus longirostris yumanensis* – federally endangered), and southwest willow flycatcher (*Empidonax traillii extimus* – federally endangered), have the potential to occur within the county (USFWS 2012a), and neither have been detected during Project field surveys (Section 5.2.1). The yellow-billed cuckoo is a candidate species with potential to occur in Clark County (USFWS 2012a), although no sightings have been made during field surveys. There are no federally listed bat species known to occur in Clark County (USFWS 2012a).

3.2 Migratory Bird Treaty Act

Under the Migratory Bird Treaty Act (MBTA) it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any native migratory bird, part, nest, egg or product. Generally speaking, the MBTA protects all birds in the U.S., except gallinaceous birds (e.g., upland game birds, such as greater sage grouse *Centrocercus urophasianus*, wild turkey *Meleagris gallopavo*, and Hungarian partridge *Perdix perdix*) rock pigeons (*Columba liva*), Eurasian collared doves (*Streptopelia decaocto*), European starlings (*Sturnus vulgaris*), and house sparrows (*Passer domesticus*). The USFWS has established a permitting scheme for a variety of intentional activities, such as hunting and scientific research, but has not done so for the incidental take of migratory birds during otherwise lawful activities. As a result, there is no permitting framework that allows a company to protect itself from liability resulting from take at wind facilities; however, the USFWS does not usually take action under the MBTA if good faith efforts have been made to minimize impacts. As is the case with all wind energy projects, a variety of birds protected under the MBTA occur within and/or around the Project site.

3.3 Bald and Golden Eagle Protection Act

The BGEPA prohibits the take of any bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*), alive or dead, including any part, nest, or egg. "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" a bald or golden eagle. "Disturb" means to agitate or bother an eagle to a degree that causes, or is likely to cause (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. Historically permits were not available under the BGEPA; however, a rule change in 50 CFR in November 2009 provided a mechanism to acquire permits for incidental take resulting from an otherwise lawful activity (§22.26).). Further, on April 12, 2012 the USFWS announced an Advanced Notice of Proposed Rulemakeing to potentially further amend the November 2009 regulations on the issuance of incidental take permits for eagles. The Draft Eagle Conservation Plan Guidance outlining the steps requested for permits was released in February 2011 (USFWS 2011a). This Guidance will likely change as a result of the rulemaking process. Golden eagles are known to occur in Clark County, and were rarely detected during field surveys (Section 5.2.1). No bald eagles have been sighted within the Project or vicinity during field surveys (Section 5.2.1

3.4 Nevada State Codes

Under Nevada law and regulation, any wildlife receiving the distinction of fully protected species may not be captured, removed or destroyed at any time except with special permit as provided under Nevada Revised Statutes (NRS) 503.584-503.589 and Nevada Administrative Code (NAC) 503.093. Section 503.093 indicates that protected species include wildlife species that are classified as sensitive, threatened or endangered by NDOW and that an "appropriate license, permit or authorization required to hunt, take or possess protected wildlife; (NRS 501.105**,** 501.181)" is necessary. A number of bird and bat species are protected under NRS 501; protected species with potential to occur within the Project are listed within Table 4 within Section 5.2.

4.0 DECISION FRAMEWORK

Duke Energy Renewables has adopted the decision framework and "tiered" or stepwise process, as currently recommended in the USFWS Land-based Wind Energy Guidelines (USFWS 2012). This tiered process that has been and is being implemented at the Project includes the following:

Tier 1: Preliminary evaluation or screening of sites (landscape-level screening of possible project sites);

Tier 2: Site characterization (broad characterization of one or more potential project sites);

Tier 3: Field Studies to document site-specific wildlife conditions and predict project impacts (site-specific surveys and assessments at and around the proposed project site);

Tier 4: Perform Post-construction fatality studies to assess and evaluate direct avian and bat fatalities resulting from turbine blade strikes; and

Tier 5: Other post-construction studies to assess and evaluate direct and indirect impacts to certain species of concern (i.e., greater sage-grouse and golden eagles), including habitat impacts, nest productivity, and other potential impacts.

This process and decision framework starts out general or broad and becomes more specific as information is gathered and the potential for avian and bat issues is better understood during each tier. Information gathered addressing the potential for avian and bat issues helps to answer questions and formulate additional questions that may need to be addressed in subsequent tiers. The stepwise or "tiered" approach ensures that sufficient data are collected on avian and bat species to enable Duke Energy Renewables to make informed decisions regarding the proposed project while ensuring that Duke Energy Renewables is complying with its corporate environmental policy.

These specific studies that have been or will be conducted at the Project will be used to inform and direct subsequent studies and surveys for the Project, as well as to identify the potential need for additional conservation measures. The following sections provide details of the tiered process being utilized for Project. They also identify avoidance and minimization measures that Duke Energy Renewables is planning or may implement based on the results of studies conducted to date and the anticipated impacts of those measures.

5.0 PROJECT-SPECIFIC RESULTS FROM THE PRE-CONSTRUCTION EVALUATION PHASE AND PROJECT SITING

5.1 Site Characterization/Site Visit (Tier 1 and 2)

A site visit was conducted by Tetra Tech in February 2 and 3, 2007 as part of an Environmental Assessment to evaluate the potential impacts caused by building six met towers for the proposed Searchlight Project (Tetra Tech 2007). Tetra Tech biologists reviewed existing information on biological resources in the Project area prior to conducting fieldwork. This review included federally-listed sensitive-species from lists provided by the USFWS office for Clark County, the BLM list of special status species, and the Nevada Natural Heritage Database (Tetra Tech 2007). Based upon the data review and results of the site visit, the findings indicated low potential for occurrence of special status and sensitive bird and bat species within the Project area.

5.2 Baseline Wildlife or Site-Specific Field Studies (Tier 3)

In response to concerns about potential impacts to avian and bat species resulting from the development of the Project, a variety of field studies and literature reviews were initiated (Table 3). The geographic coverage of each study may differ due to changes in the anticipated turbine layout at the time when the studies were initiated. Full details about methods, exact areas covered, and the locations and numbers of species detected during the surveys can be found within the original reports provided in Appendix A. Survey highlights are summarized below.

Table 3. Survey Efforts to Date at the Searchlight Wind Energy Project.

Study	Taxa	Dates conducted	Type of Survey	Reports
Avian use surveys	All birds	Fall 2007, spring 2008, fall – winter 2008-2009, spring 2009	Point counts	Tetra Tech 2008, 2010
Raptor nest surveys	Raptors	Spring 2008, spring 2009	Ground and aerial	Tetra Tech 2008, 2010
Bat acoustical monitoring at mines and met towers	Bats	April 2008 – April 2010	Passive acoustic	O'Farrell 2009a, 2010
Golden eagle and raptor nest surveys	Golden eagles, raptors	Spring 2011	Aerial	Tetra Tech 2011
Bald eagle winter use surveys	Bald eagles	December 2011 – January 2012	Ground	Tetra Tech 2012

5.2.1 Avian Use Surveys

Avian use surveys were conducted for 2 years within the Project area. Weekly surveys were conducted in fall 2007, spring 2008, fall 2008 through winter 2009, and spring 2009 for a total of 4 survey seasons (Tetra Tech 2008, 2010). Surveys in spring captured breeding birds and spring migrants, winter residents were documented during winter surveys, and fall migrants were sampled during fall surveys. Fixed-point count surveys (800-meter [m] radius) were conducted for 20 minutes (min) at points distributed throughout the Project, and covered 30.6 percent of the Project area (Figure 3).

A total of 4,299 birds were observed within the Project, including 3,954 birds of 64 species and 345 individual birds that could not be identified to species. Overall mean bird use within the Project was 5.97 birds/20 min and ranged from 0 to 44 birds/20 min. Variation in mean use occurred among the 4 survey periods, with fall surveys having a lower overall mean use than spring surveys (3.81 birds/20 min in fall 2007 and 4.08 birds/20 min in fall/winter 2008-2009 versus 7.21 birds/20 min in spring 2008 and 8.46 birds/20 min in spring 2009). More species were detected during the spring (42 in 2008, 45 in 2009) compared to fall and winter (33 in 2007, 30 in 2008-2009).

Songbirds had the highest mean use out of all species groups observed (4.44 birds/20 min). The species with the highest mean use were the black-throated sparrow (1.26 birds/20 min), house finch (0.33 birds/20 min), the ash-throated flycatcher (0.25 birds/20 min) and the horned lark (0.24 birds/20 min). Overall mean raptor use for all surveys for was 0.31 birds/20 min. Raptor species with the highest mean use over all surveys were the turkey vulture (0.12 birds/20 min), red-tailed hawk (0.11 birds/20 min), and American kestrel (0.05 birds/20 min). Each other raptor species, including northern harrier, Cooper's hawk, golden eagle, burrowing owl, prairie falcon, and sharp-shinned hawk had a mean use of 0.01 birds/20 min or less. No bald eagles were seen.

The common raven had the highest overall encounter rate (number of individuals flying within the anticipated RSA) with 0.15 birds flying within the anticipated RSA height range/20 min. The turkey vulture, red-tailed hawk, and American kestrel had the highest overall encounter rates among raptor species (≤0.10 birds flying at RSA height/20 min or less).

5.2.1.1 Golden Eagles

During the fall 2007 survey, 2 golden eagles were observed during point count surveys (0.014 birds/20 min) and 2 were observed incidentally. Both individuals were observed flying within the anticipated RSA, for an overall encounter rate of 0.014 birds/20 min flying within the RSA for fall 2007. No further observations of golden eagles occurred in subsequent survey seasons for an overall use rate of 0.003 birds/20 min; this rate was obtained by dividing 2 observations by 667 counts.

5.2.1.2 Special Status Species

No federally endangered, threatened or candidate species for Clark County, NV (USFWS 2012a) were detected during avian surveys or as incidental observations. Five species observed over all surveys were Nevada BLM, or Nevada state-sensitive species: burrowing owl, loggerhead shrike, LeConte's thrasher, Bendire's thrasher, and Brewer's sparrow (Table 4). The Project area overlaps the breeding range of each of these species. All species listed above had encounter rates of <0.01 birds/20 min flying within the RSA when analyzed per survey and overall, primarily because of their low mean use within the Project area.

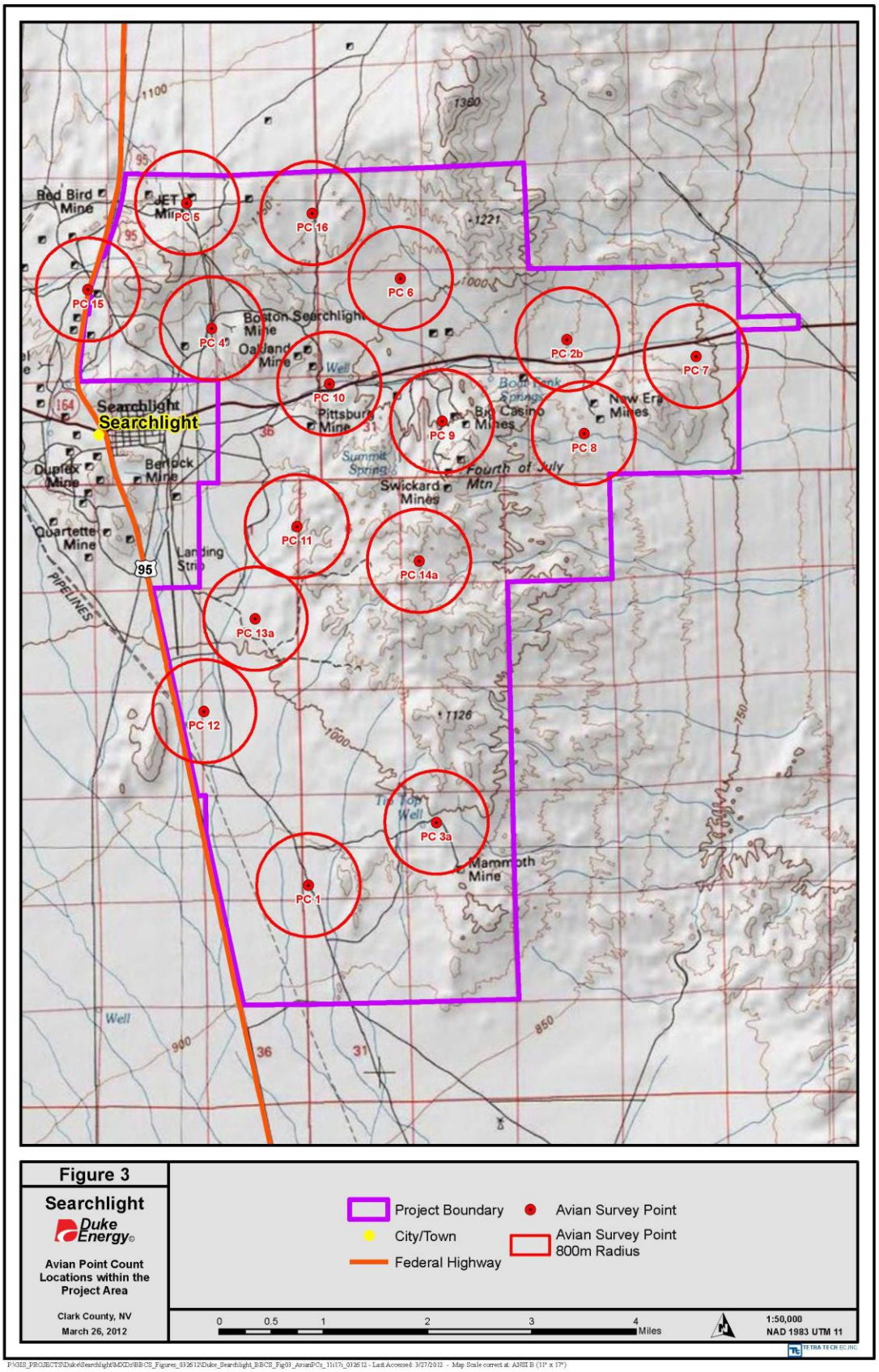


Figure 3. Avian Point Count Locations within the Project Area

Table 4. Special Status Species Occurrence within the Project Area

Species	Status[1]	Presence within Project Area
Bald eagle	BLM, NSE	None detected
Bendire's thrasher	BLM	Spring 2008 (2 birds)
Brewer's sparrow	BLM, NSS	Fall 2007, Spring 2008, and Spring 2009 (78 birds)
Ferruginous hawk	BLM	None detected
Golden eagle	BLM	Fall 2007 (2 birds plus 1 observed incidentally)
Loggerhead shrike	BLM, NSS	All 4 seasons (126 birds)
LeConte's thrasher	BLM	Spring 2008 (3 birds)
Peregrine falcon	BLM, NSE	None detected
Southwestern willow flycatcher	BLM, NSE	None detected
Western burrowing owl	BLM	Spring 2008 (2 birds)
Western snowy plover	BLM	None detected
Western yellow-billed cuckoo	USFWS Candidate, BLM, NSS	None detected
Yuma clapper Rail	USFWS Endangered, BLM, NSE	None detected

[1]BLM = Nevada BLM Sensitive Species; NSS = Nevada State Sensitive Species; NSE = Nevada State Endangered

5.2.2 Raptor Nest Surveys

Raptor nest surveys were conducted in spring 2008 and spring 2009 (Tetra Tech 2008, 2010; Table 5). In 2008, surveys were conducted by foot within the Project area (2008 layout) and approximately a 1-mile buffer (Tetra Tech 2008). One active red-tailed hawk nest and 5 inactive stick nests were found, with an additional red-tailed pair thought to be breeding within the Project area but no nest was found. A pair of American kestrels was also observed to be breeding in the Project area but no nest was located. Three burrowing owl burrows were observed, with 2 of the 3 burrows occupied by owl pairs. Both a barn owl and great horned owl pair were found utilizing abandoned mine shafts in the northern portion of the Project area.

In spring 2009, an aerial survey of the Project area and a 2-mile buffer conducted in April and follow-up ground surveys in May located 10 active red-tailed hawk nests (Tetra Tech 2010; Table 5). Additionally, 9 inactive stick nests and a breeding barn owl pair within a mine shaft were located. No active burrowing owl burrows were found in 2009. One of the red-tailed hawk nests and three of the inactive stick nests were located within the Project area (April 2009 layout).

Table 5. Raptor Nests Located During 2008 and 2009 Raptor Nest Surveys

Raptor Species	2008	2009
Red-tailed hawk	1	10
Inactive nests	5	9
Burrowing owl burrows	2 active, 1 inactive	None active
TOTAL	**9**	**19**

5.2.3 Bat Acoustic Monitoring

Acoustic detection of bats occurred year-round for 2 years, starting 9 April 2008 and concluding on 15 April 2010 (O'Farrell 2009a, 2010), in order to generate a baseline of knowledge on temporal changes in species composition and differential habitat use within the Project. The six stationary acoustic monitoring stations utilizing Anabat SD1 detectors were established at select sites within the Project area (Figure 4). Sites were selected that sampled the general habitat that may be affected by the proposed activities, and corresponded to locations proposed for wind turbines based on the Project layout at the time the protocol was developed (2008; Figure 4). The objective of this portion of the monitoring effort was to assess species richness and general level of bat use within the Project area. Monitoring stations were placed on four existing met towers, with acoustic detectors located at 2 m aboveground (Met Low) and 40-50 m aboveground (Met High). The dispersion of monitoring stations provided an adequate examination of general bat usage over the entire proposed Project area. Two additional stations (Stakes 1 and 2) were selected to sample areas deemed as potential movement corridors, and each only had a single detector 2 m above ground (Figure 4). Changes in the size of the Project area and turbine placement resulted in removal of one acoustic station (Met 4) in October 2008 and subsequent placement of a new stake station (Stake 4) in the southeastern portion of the Project area (Figure 4); Stake 4 was established 21 January 2009.

During the second year of bat surveys, additional acoustic monitoring stations were placed near local abandoned mines with known roosts (suspected maternity colonies) in order to address agency concerns about potential impacts of turbine placement (O'Farrell 2010). Monitoring at the mines occurred from May 1, 2009 to April 15, 2010.Two mine complexes (Mine 1 and 2) were identified from BLM data as being within the development area of the proposed Project, and judged to contain significant bat resources. Reconnaissance of the mines verified suitable conditions (e.g. wash or dry creek systems) near mine entrances for use as bat foraging and movement corridors. Three stake monitoring stations were established around each mine complex to monitor the bat activity associated with the respective wash systems.

Identification of species from acoustic recordings used the methods of O'Farrell et al. (1999) based on frequency characteristics, call shape, and comparison with a comprehensive library of vocal signatures developed by O'Farrell and colleagues. Thus, both activity data and species richness (number of species verified as present) were obtained for each location. Species use data were measured using an Index of Activity (IA), or the magnitude of each species contribution to spatial use, by using the sum of 1-minute time increments for which a species was detected as present divided by the number of nights of sampling (Miller 2001). The IA was multiplied by a factor of 100 and rounded to the nearest whole number in order to bring the smallest numbers up to whole numbers.

5.2.3.1 General Patterns

A total of 16 species of bats were recorded over both years (Table 6). One species, *Lasionycteris noctivagans*, was recorded in the first year of monitoring but not in the second (common names listed in Table 6). Conversely, *Macrotus californicus* and *Nyctinomops femorosaccus* were not recorded until the second year of monitoring. Seven of the species are listed as Federal Species of Special Concern (SOSC), four of them are State-listed Sensitive and three are State-listed Protected (Table 6). Species richness varied among the stations but no site had representatives of all 16 species found within the study area (Table 7).

Bat activity varied among stations and between detector heights. The highest total IA among all stations was found at Stake 4, Met 6 Low, Mine 2A and 2C; the total IA at these areas was approximately 1.4 times greater than that observed at the next most abundant areas (Table 7). All three High stations had the lowest total IA during the study with the exception of Met 1 in the first year of study (Table 7). In general, the majority of the bat activity at Met stations (76-81 percent) occurred at the Low rather than High stations (Table 7). Among Mine stations, the total IA varied in relation to the direction of station placement away from each mine. Twice as much activity was recorded in the drainage west of Mine 1 (1C) as was recorded either east (Mine 1A) or north (Mine 1B) of the mine. Likewise, more than twice as much activity was recorded east (Mine 2A) and south (Mine 2C) of Mine 2 as was recorded north (Mine 2B) of the mine.

All the data for Met stations were combined and analyzed for nightly patterns in activity. Two basic patterns were revealed. First, a crepuscular pattern was exhibited by *Parastrellus hesperus* with a small discrete peak just before sunset followed by a large peak in activity within the first hour after sunset. The remaining species demonstrated a later initial peak and then prolonged moderate activity through much of the night. The patterns were similar regardless of altitude of sampling.

Annual and seasonal variation in bat activity was also evident. The second year of monitoring had use rates 2-3 fold greater than the first year of monitoring. Seasonal patterns in use revealed the highest levels of activity to be during summer and early fall months. Migratory species had higher presence in spring than in fall months.

5.2.3.2 Species-specific Patterns

Tadarida brasiliensis and *P. hesperus* accounted for the majority of bat activity at both height levels throughout both years of monitoring (Table 7). Both species ranked as primary (contributed >25 percent of all bat activity) or secondary species (species contributed <25 but >6 percent) at all stations. *T. brasiliensis* had higher activity rates in the first year of study compared to the second, and was generally a secondary species at Mine stations (Table 7). In contrast, *P. hesperus* was ranked as primary more frequently in the second year of monitoring. *M. californicus* and *Myotis yumanensis* were also commonly ranked as primary or secondary species. *Eptesicus fuscus* was a secondary species at four locations among both years of study, but generally had low activity rates. The remaining 11 species including eight special status species (Table 7) were infrequently detected during both years of monitoring and individually contributed 6 percent or less to bat activity at any given station.

Within Mine stations, *M. yumanensis* was active at both mine complexes and regularly left the Project area immediately upon exiting day roosts to forage outside of the Project site at foraging

areas associated with Lake Mohave. Although both mine complexes were previously identified as being used by *Corynorhinus townsendii townsendii*, this species was absent from all Mine stations (Table 7), indicating lack of presence during the monitoring period.

Ma. californicus, My. californicus, Myotis ciliolabrum, Myotis yumanensis, P. hesperus, and *T. brasiliensis* are year-round resident species that were detected during the study (Table 6). *Antrozous pallidus* and *E. fuscus* are breeding residents that appear to be absent from the Project area in winter. Detections from early spring through late fall suggest that some, at least, of the breeding residents may remain locally and hibernate through the winter. *C. townsendii townsendii* is not present during the summer breeding season but apparently occurs, at least in small numbers, during the remaining portion of the year. The remaining seven species (*Myotis thysanodes, Lasiurus blossevillii, Lasiurus cinereus, L. noctivagans, N. femorosaccus, Nyctinomops macrotis,* and *Eumops perotis californicus*; Table 6) appear to be transient in the spring and/or fall months.

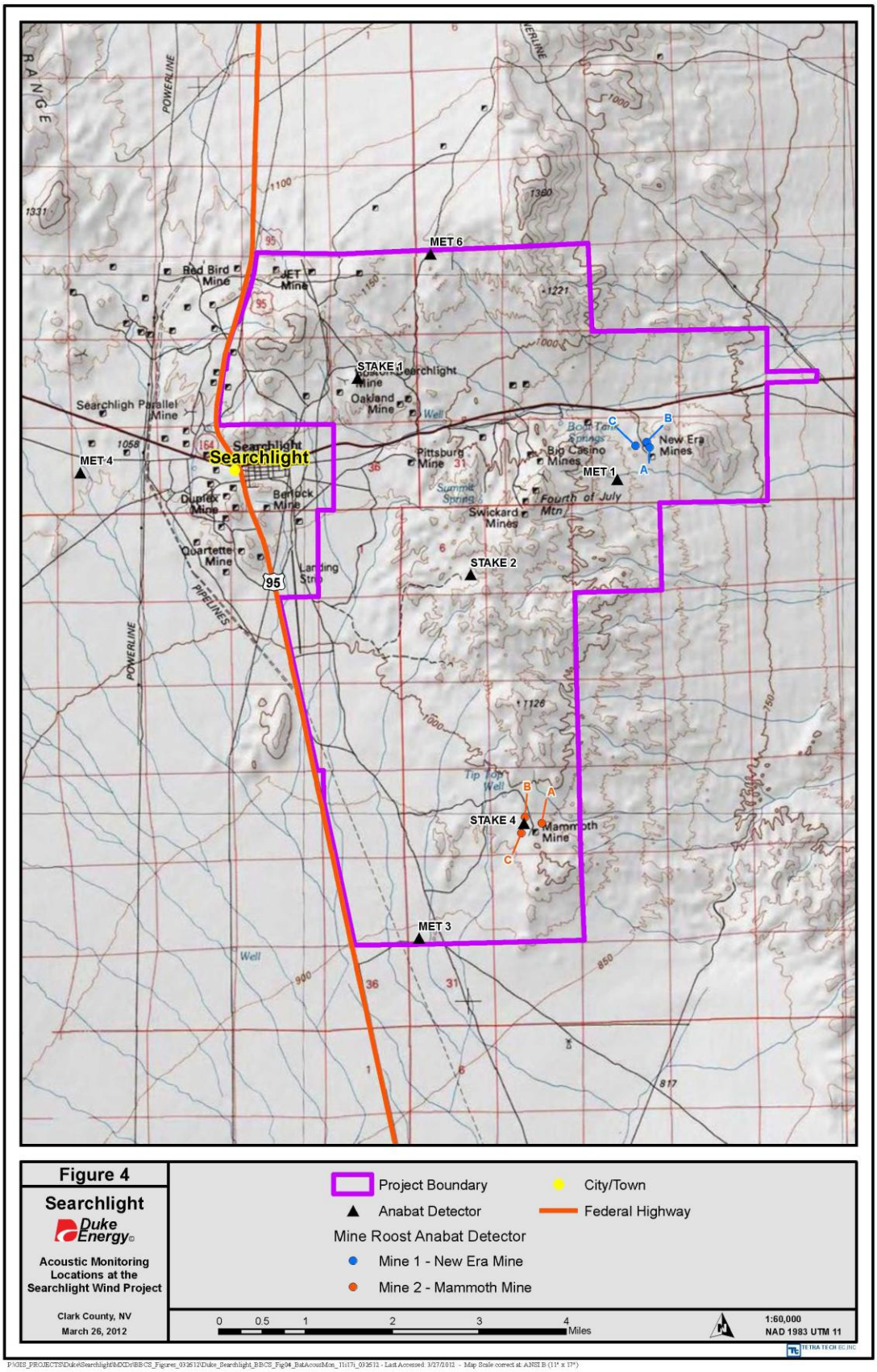


Figure 4. Acoustic Monitoring Locations at the Searchlight Wind Energy Project

Table 6. Checklist and Status of Bats Detected Within the Searchlight Wind Energy Project Site, 2008-2010.

Scientific Name	Common Name	Status[1]	Resident/Migrant Status	Years Detected
Macrotus californicus	California Leaf-nosed Bat	Federal SOSC, NSS	Year-round resident	2009-2010
Myotis californicus	California Myotis	-	Year-round resident	2008-2010
Myotis ciliolabrum	Western Small-footed Myotis	Federal SOSC, BLM	Year-round resident	2008-2010
Myotis thysanodes	Fringed Myotis	Federal SOSC, BLM NSP	Migrant	2008-2010
Myotis yumanensis	Yuma Myotis	Federal SOSC	Year-round resident	2008-2010
Lasiurus blossevillii	Western Red Bat	BLM, NSS	Migrant	2008-2010
Lasiurus cinereus	Hoary Bat	BLM	Migrant	2008-2010
Lasionycteris noctivagans	Silver-haired Bat	BLM	Migrant	2008-2009
Parastrellus hesperus	Western Pipistrelle	-	Year-round resident	2008-2010
Eptesicus fuscus	Big Brown Bat	-	Year round resident; may be breeding resident only in Project area.	2008-2010
Corynorhinus townsendii townsendii	Pacific Western Big-eared Bat	Federal SOSC, BLM, NSS	Year-round resident	2008-2010
Antrozous pallidus	Pallid Bat	NSP	Year round resident; may be breeding resident only in Project area.	2008-2010
Tadarida brasiliensis	Brazilian Free-tailed Bat	BLM, NSP	Year-round resident	2008-2010
Nyctinomops femorosaccus	Pocketed Free-tailed Bat	-	Migrant	2009-2010

Scientific Name	Common Name	Status[1]	Resident/Migrant Status	Years Detected
Nyctinomops macrotis	Big Free-tailed Bat	Federal SOSC	Migrant	2008-2010
Eumops perotis californicus	Greater Western Mastiff Bat	Federal SOSC, NSS	Migrant	2008-2010

[1]SOSC = Species of Special Concern, NSP= Nevada State Protected, NSS = Nevada State Senstive, BLM = Nevada BLM sensitive species
Nomenclature follows Hoofer et al. (2006), Wilson and Cole (2000), and Wilson and Reeder (1993).

Table 7. Summary of Bat Activity from Acoustic Monitoring in April 2008 – April 2010

Station	Overall Species Richness	Index of Activity		Species Presence (2008-2009/2009-2010)[1]															
		2008-2009	2009-2010	MACA	MYCA	MYCI	MYTH	MYYU	LABL	LACI	LANO	PAHE	EPFU	COTO	ANPA	TABR	NYFE	NYMA	EUPE
Stake 1	11	363	497	-/-	S/P	I/I	-/-	I/S	-/I	I/I	I/-	S/P	I/S	I/-	I/I	P/S	-/-	-/-	-/-
Stake 2	11	460	259	-/-	I/S	I/I	-/-	I/S	-/-	I/-	-/-	S/P	I/I	I/I	I/I	P/S	-/-	I/-	-/I
Stake 4	11	543	687	-/-	S/P	I/I	-/-	I/S	-/-	I/I	-/-	S/P	I/I	-/I	I/I	P/P	-/-	-/I	-/I
Met 1 High	12	190	100	-/-	I/-	I/-	-/-	I/I	-/-	I/I	-/-	I/S	I/-	I/-	I/-	P/P	-/I	-/I	I/I
Met 1 Low	11	118	326	-/-	-/S	I/I	-/-	I/S	-/I	-/I	-/-	P/P	I/I	-/I	I/-	P/S	-/I	-/-	-/-
Met 3 High	12	117	119	-/-	I/-	I/-	-/-	S/I	-/-	I/I	-/-	S/S	S/I	I/-	I/-	P/P	-/I	-/I	-/I
Met 3 Low	12	333	497	-/-	S/P	I/I	-/-	S/S	-/-	I/I	-/-	S/P	I/I	I/I	I/I	P/P	-/I	-/I	I/I
Met 4 High	9	457	-	-/na	I/na	S/na	-/na	I/na	-/na	I/na	-/na	S/na	S/na	-/na	I/na	P/na	-/na	-/na	I/na
Met 4 Low	10	687	-	-/na	P/na	S/na	I/na	I/na	-/na	I/na	I/na	S/na	S/na	-/na	I/na	P/na	-/na	-/na	-/na
Met 6 High	10	140	140	-/-	I/-	I/-	-/-	-/I	-/-	I/I	-/-	S/P	I/I	-/-	I/-	P/P	-/I	-/-	I/I
Met 6 Low	12	802	614	-/-	S/S	I/I	I/I	I/I	-/-	I/I	-/-	P/P	I/I	-/I	I/I	S/S	-/-	-/I	I/I
Mine 1A	7	-	290	na/I	-/P	na/I	na/-	na/S	na/-	na/-	na/-	na/P	na/I	na/-	na/-	na/S	na/-	na/-	na/-
Mine 1B	7	-	250	na/-	-/S	na/I	na/-	na/S	na/I	na/-	na/-	na/P	na/I	na/-	na/-	na/P	na/-	na/-	na/-
Mine 1C	11	-	497	na/I	-/P	na/I	na/-	na/P	na/I	na/I	na/-	na/P	na/I	na/-	na/I	na/S	na/-	na/I	na/-
Mine 2A	7	-	766	na/-	-/S	na/I	na/-	na/S	na/-	na/I	na/-	na/P	na/I	na/-	na/-	na/S	na/-	na/-	na/-
Mine 2B	6	-	341	na/-	-/S	na/-	na/-	na/S	na/-	na/I	na/-	na/P	na/I	na/-	na/-	na/S	na/-	na/-	na/-
Mine 2C	8	-	775	na/-	-/P	na/I	na/-	na/S	na/-	na/I	na/-	na/P	na/I	na/-	na/I	na/S	na/-	na/-	na/-

1Primary (P) = species contributed > 25 percent of all bat activity; Secondary (S) = species contributed < 25 percent but > 6 percent of bat activity; Infrequent (I) = species contributed ≤ 6 percent of activity; - = not detected; na = not monitored at that location for that year of study. Species abbreviations are derived from the first two letters of the genus and the first two letters of the species (Table 6).

5.2.4 Golden Eagle and Raptor Nest Surveys

Aerial surveys were conducted for nests of golden eagles and other raptor species in spring 2011 (Tetra Tech 2011). The survey area was the area within a 10-mile buffer of the Project area (as of December 2009), exclusive of the area surveyed in 2009 (Project area and 2-mile buffer). A survey route of suitable nesting habitat in this area was developed in conjunction with an NDOW biologist. Nest data collected included species, active or inactive status, substrate, condition, and photographs. Protocol followed that recommended by the USFWS (Pagel et al. 2010).

A total of 16 active raptor nests and 49 inactive stick nests were identified during 2011 surveys (Table 8; Figure 5). These nests are in addition to the 10 red-tailed hawk nests and 9 inactive stick nests located in 2009, for a grand total of 26 active raptor nests and 58 inactive stick nests within the Project area and 10-mile buffer. Active nests located in 2011 included 1 confirmed and 2 probable golden eagle nests (presence of chick but no adult) and 12 confirmed and 1 probable red-tailed hawk nests (presence of chicks but no adult). Golden eagle nest 011 (Figure 5), was updated from probable to confirmed in 2012 based on NDOW datasets, altering the count to 2 confirmed and 1 probable golden eagle nests. All of the golden eagle nests were located on cliffs, whereas only 3 (2 confirmed, 1 probable) red-tailed hawk nests were on cliffs. All other red-tailed hawk nests were on transmission towers. Among inactive stick nests, 35 were found on cliffs (3 in 2009, 32 in 2011), with the rest found on manmade structures (Figure 6). The golden eagle nests were located 4.3 miles (6.9 km; probable golden eagle nest #11), 10.0 miles (16 km; probable golden eagle nest #23), and 10.2 miles (16.4 km; confirmed golden eagle nest #65) from the Project boundary (Figure 5). Two large inactive nests were located approximately 0.5 miles from golden eagle nest #11, and may be alternate nests within that territory. No inactive large nests were located near the other 2 golden eagle nests, possibly as a result of limited survey effort at the edge of the survey area where nests 23 and 65 were located.

Table 8. Raptor Nests Located During 2009 and 2011 Aerial Raptor Nest Surveys

Raptor Species	2009 Surveys			2011 Surveys			Grand Total
	Project Area	2-mile Buffer	10-mile Buffer	Project Area	2-mile Buffer	10-mile Buffer	
Golden eagle	0	0	0	0	0	3[1]	**3**
Red-tailed hawk	1	8	10	1	3	13[2]	**23**
Inactive stick nests	2	7	9	0	0	49	**58**
TOTAL	**3**	**15**	**19**	**1**	**3**	**65**	**84**

[1]Includes 2 probable golden eagle nests
[2]Includes 1 probable red-tailed hawk nest

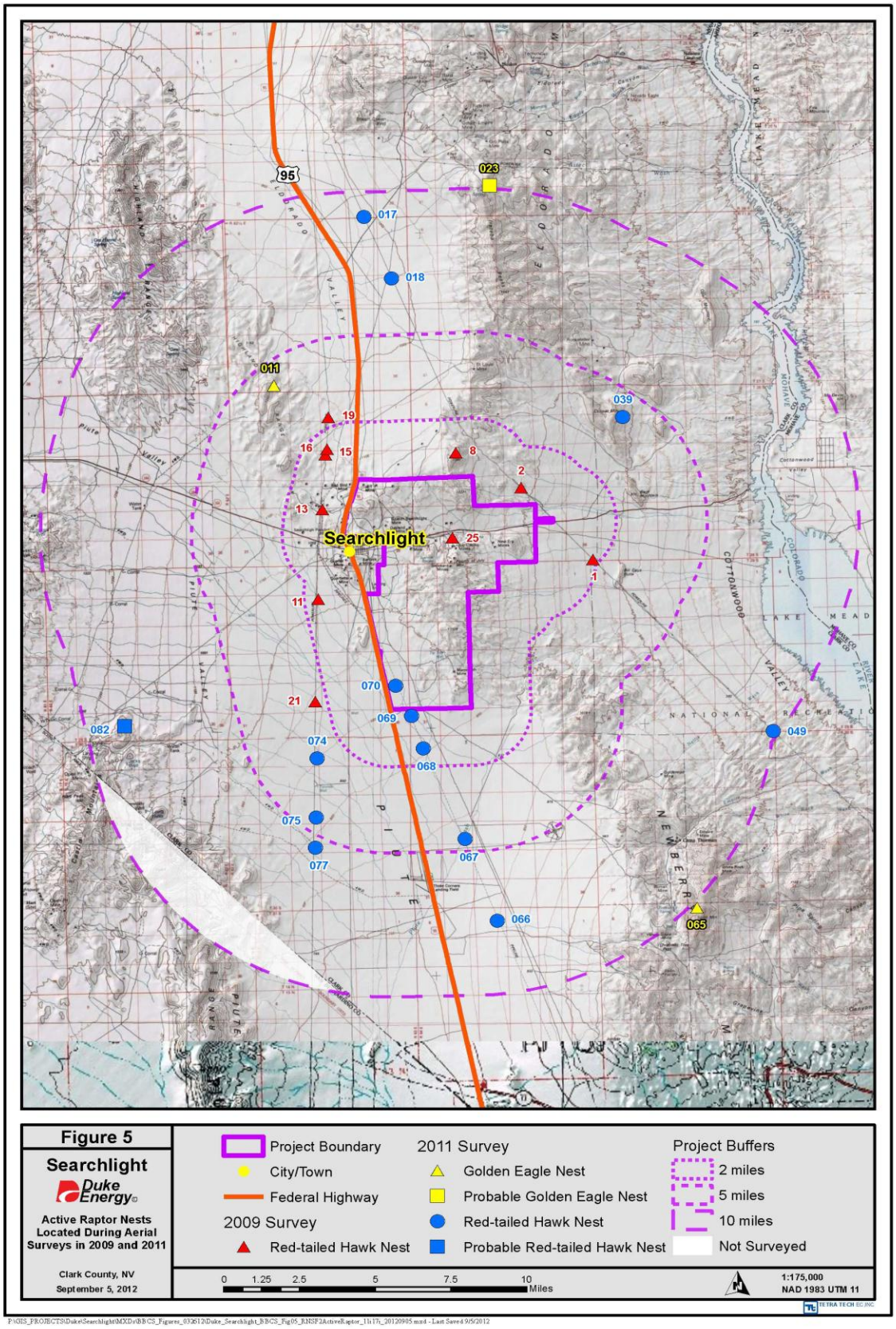


Figure 5. Active Raptor Nests Located During Aerial Surveys in 2009 and 2011

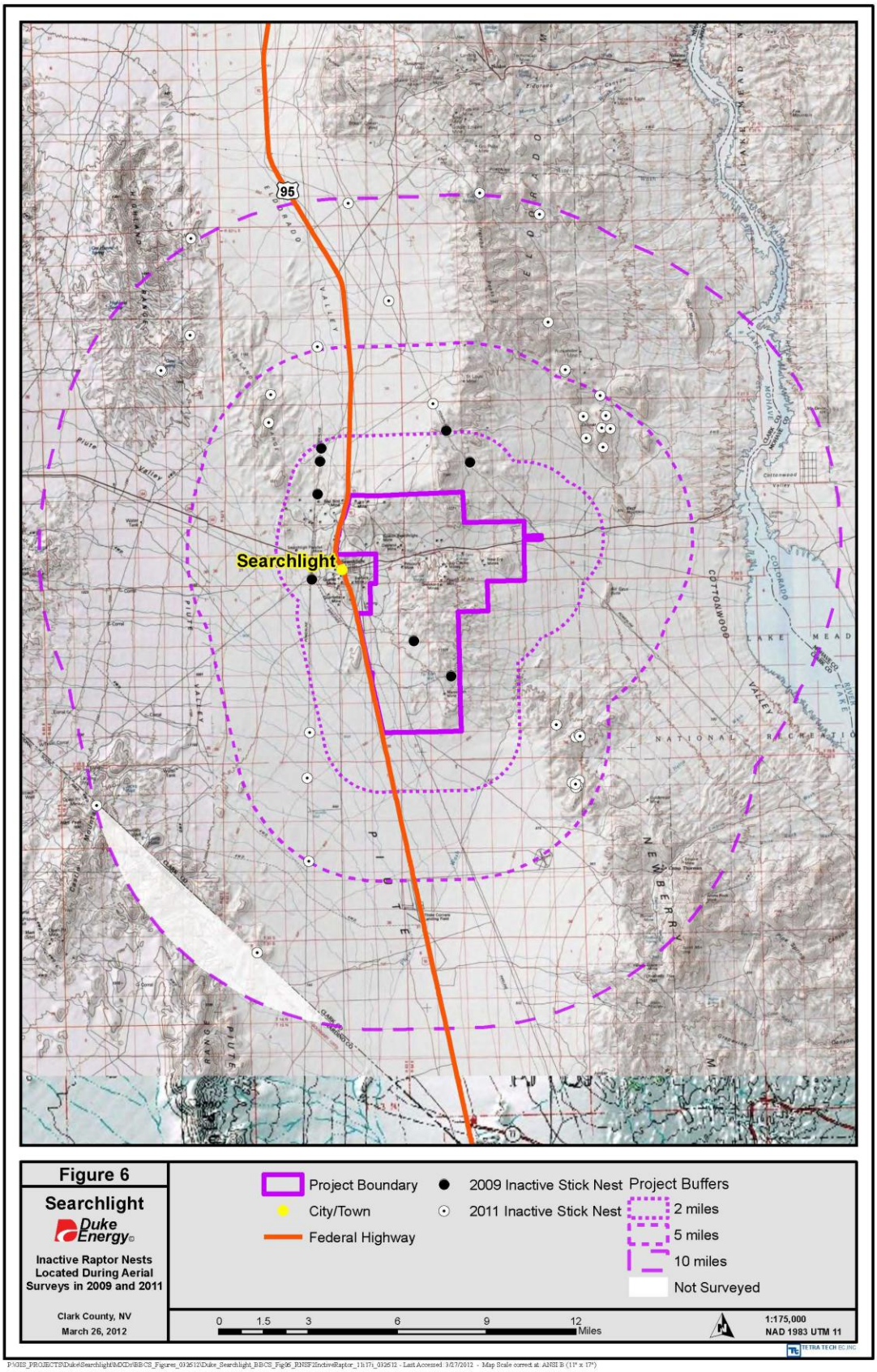


Figure 6. Inactive Raptor Nests Located During Aerial Surveys in 2009 and 2011

5.2.5 Bald Eagle Winter Surveys

In response to USFWS and NDOW concern regarding potential winter use by bald eagles of the Project area and Lake Mohave, ground-based eagle surveys were performed roughly every other week from December 16, 2011 to January 26, 2012 (Tetra Tech 2012). These surveys were designed to assess spatial and temporal patterns of bald eagle use, although incidental observations of golden eagles would be recorded. Surveys were conducted from 2 survey locations established in the northeastern-most region of the Project on topographical high points, using a visibility distance cut-off of 3 miles, past which species identification is questionable. Each survey session was 4 hours in length, and both locations were surveyed concurrently by 2 surveyors (1 at each location). Each location was surveyed 4 times, with time of day rotated between morning and afternoon periods. No bald eagles or golden eagles were observed during the 32 hours of surveys conducted, nor were any individuals of these species observed incidentally.

5.3 Risk Assessment (Tier 3)

This section outlines potential risks to birds and bats related to the construction and operation of the Searchlight Wind Energy Project and supporting facilities; other effects are analyzed in the EIS. While golden eagles are mentioned in 5.3.1 for the sake of completeness, impacts to golden eagles are discussed solely in Section 5.3.2. Methods to avoid or minimize these risks through Project design, construction, and operation are provided in subsequent sections, and Section 9 outlines mitigation and adaptive management for unavoidable risks.

This section provides a qualitative risk assessment for the effect of a factor (e.g., collision, electrocution) on birds other than eagles and bats. The intention is not to predict the number of fatalities due to turbine collision as pre-construction data poorly predicts fatalities for birds (Ferrer et al. 2012), but to determine if any species is at high risk to inform post-construction fatality monitoring. The risk assessment is specific to the factor (e.g., turbine collision) and does not evaluate the effect on population dynamics because for most species, population trend data is not available. For wind turbine collisions, a risk profile was calculated using the following equation:

Risk profile = percent of surveys in which the species was observed x the percent flying x the percent flying in the RSA

The risk profile is scaled between 0 and 1. A risk profile between 0 – 0.33, 0.34 – 0.66, 0.67 – 1.0 is considered low, moderate, and high risk, respectively. Supplemental data from post-construction fatality monitoring studies is used to inform the final risk categorization. For example, a risk profile may indicate that risk to common raven is high, but common raven is not a common fatality at wind projects within their range and the risk categorization would be adjusted to low (Johnson and Erickson 2010). Wind energy fatality data is limited for the Mojave Desert, but it is not expected that collision risk varies regionally. For example, horned lark is a common fatality in the Columbia Plateau ecoregion in Washington and Oregon (Johnson and Erickson 2010), and horned lark is assumed to be at moderate to high risk of collision with wind turbines throughout its range.

5.3.1 Birds (Non-eagles)

5.3.1.1 Collision

Birds have been identified as a group at risk because of collisions with wind turbines and power lines (Erickson et al. 2005, Drewitt and Langston 2006, Arnett et al. 2007). Specifically, migrant passerines (e.g., songbirds) are found more often in post-construction mortality monitoring compared to other groups of birds (Arnett et al. 2007). At newer generation wind energy facilities outside of California, approximately 80 percent of documented fatalities have been songbirds, of which 50 percent are often nocturnal migrants (Erickson et al. 2001, Drewitt and Langston 2006, Johnson et al. 2007, Strickland and Morrison 2008). It is estimated that less than 0.01 percent of migrant songbirds that pass over wind farms are killed, based on radar data and mortality monitoring (Erickson 2007). Locally breeding songbirds may experience lower mortality rates than migrants because many of these species tend not to fly at turbine rotor heights during the breeding season. However, some breeding songbird species such as the horned lark have behaviors that increase their risk of collisions with turbines. Most songbirds are short-lived and have high reproductive output, and their population growth rates are more sensitive to reproductive failure than to adult survival (Stahl and Oli 2006, Arnold and Zink 2011). Therefore, collision mortality for most songbird species is expected to have negligible effects on population dynamics.

Results of 2 years of avian point count surveys revealed that the bird community within and surrounding the Project area is made up of species typical to the Mojave desert, and exhibits little change seasonally. Songbirds, gamebirds, and pigeon/doves are likely to use the Project area on occasion and were the most commonly observed species groups during the 2007-2009 avian point count surveys (Tetra Tech 2010). The three primary species dominating the community were black-throated sparrow, Gambel's quail, and mourning dove. Despite its presence within the Pacific Flyway (USFWS 2011b), the Project area does not receive a large influx of breeding birds in the spring, and migrants were detected during point counts infrequently and in low numbers. Although diurnal point counts are not optimal for detecting nocturnally migrating songbirds, the weather patterns in the Searchlight area rarely create collision risk situations such as a low cloud ceiling or precipitation that influence migrant songbird stopover. In 2008, approximately 6% of the weather observations in March, April, May, August, September, and October had a cloud ceiling lower than 1500m. High wind situations in which wind direction provides a strong head wind to migratory movement, however, may influence migratory "fall out" (Schakleford 2005). However, it is unlikely that the Project area is located in a major songbird migratory route due to the harsh desert conditions. Thus, migratory species making stopovers in the area are unlikely to concentrate within the Project area due to similar habitat being readily available throughout the region and more favorable habitat existing along the Colorado River near Lake Mohave. No surveys targeting nocturnal migrants were conducted pre-construction. The relatively low overall use rates observed during surveys combined with limited habitat availability suggest that there are unlikely to be major concentrations of non-raptors during the breeding season or during migration. Despite the observation that most avian fatalities at wind farms are songbirds, raptor mortality historically has received the most attention. Raptor mortality at newer wind projects has been low relative to older-generation wind farms, although there is substantial regional variation in raptor mortality

rates (Erickson et al. 2002, 2004, Johnson et al. 2002, Kerns and Kerlinger 2004, Jain et al. 2007).

The Project area contains steep hills and mountains as well as flats, washes, and valleys that provide some suitable foraging and nesting habitat for raptors; however, raptor use within the Project area was low (<1.0 birds/20 min) over the course of the 2007-2009 avian point count surveys. Such levels of raptor use within the Project area suggest that raptor mortality is anticipated to be low (Young et al. 2003, Erickson 2007). Raptor species that are likely to be found on site primarily include turkey vulture and red-tailed hawk. However, other raptor species including northern harrier, sharp-shinned hawk, Cooper's hawk, golden eagle (see Section 3.2), American kestrel, and burrowing owl may occur within the Project area on occasion as well. Fatalities of turkey vultures and red-tailed hawks have occurred at wind farms (e.g., Kerns and Kerlinger 2004; Erickson et al. 2004),.

Of the 64 species detected during all surveys, only 10 (16 percent) had a risk profile value greater than 0.05 indicating risk to most bird species is low. Of the 10 species with a risk profile greater than 0.05, 1 species had a risk categorization of high (turkey vulture) and 4 species had a risk categorization of moderate (red-tailed hawk, American kestrel, house finch, and horned lark); the remaining 5 species had a risk categorization of low (Table 9).

Based on the summary above and information known on collision risk at other western U.S. facilities in arid environments (Table 9; mean fatality rate = 2.02 birds/MW/year), the collision risk for birds at the Project will likely be low. This risk will be further reduced through measures taken during the design, construction, and operational phases of the Project (Sections 4-6).

Table 9. Risk Categorization for Birds at the Searchlight Wind Energy Project

Species	Percent surveys detected	Percent flying	Percent flying within RSA	Risk profile	Supplemental data used to adjust risk profile	Risk categorization
common raven	14.9	80.4	74.5	0.89	Few records as fatalities	Low
turkey vulture	9.6	100.0	83.1	0.80	None	High
red-tailed hawk	8.6	68.8	78.2	0.46	None	Moderate
house finch	15	56.5	41.1	0.35	None	Moderate
American kestrel	3.2	87.2	79.4	0.22	Common fatality	Moderate
horned lark	8.6	67.6	31.7	0.18	Common fatality	Moderate
northern rough-winged swallow	1.8	100.0	90.5	0.16	None	Low
northern harrier	0.8	100.0	83.3	0.07	Few records as fatalities	Low
loggerhead shrike	13.5	28.6	13.9	0.05	None	Low
Cooper's hawk	0.8	100.0	66.7	0.05	None	Low

5.3.1.2 Electrocution

Utility lines (transmission and distribution) can potentially result in electrocution of bird species (e.g., large raptors) that have wing-spans large enough that the bird can simultaneously contact two conductors or a conductor and grounded hardware. Therefore, any structures that allow for circuit completion (i.e., flesh-to-flesh contact between energized parts or an energized and grounded part) pose an electrocution risk. To protect birds from possible electrocution, the APLIC recommends that lines in areas with eagles and other larger birds have a horizontal separation of 60 inches and a vertical separation of 40 inches between phase conductors or between a phase conductor and grounded hardware (APLIC 2006). The aboveground power lines will be built according to APLIC recommendations that are designed to reduce risk, thus the risk of electrocution to birds is expected to be low.

5.3.1.3 Disturbance/Displacement

In addition to mortality associated with wind farms, concerns have been raised that some bird species may avoid areas near turbines after the wind farm is in operation (Drewitt and Langston 2006). For example, at the Buffalo Ridge wind energy facility in Minnesota, densities of male songbirds were significantly lower in Conservation Reserve Program (CRP) grasslands containing turbines than in CRP grasslands without turbines though the causal mechanism was not studied (Leddy 1999). Reduced abundance of grassland songbirds was found within 50 meters (m) of turbine pads for a wind farm in Washington and Oregon, but the investigators attributed displacement to the direct loss of habitat or reduced habitat quality and not the presence of the turbines (Erickson et al. 2004). Research at two sites in North and South Dakota (Shaffer and Johnson 2008) suggests that certain grassland songbird species (2 of 4 studied) may avoid turbines by as much as 200 m, but these results have not been finalized nor verified at additional sites. None of these studies have addressed whether these avoidance effects are temporary (i.e., the birds may habituate to the presence of turbines over time) or permanent. Pearce-Higgins et al. (2012) found little evidence for a post-construction decline for ten species of birds at 18 wind projects in upland habitats in the UK based on data from 1 to 10 years post-construction (more than half of the data was between 1 and 3 years post-construction). However, disturbance related effects were detected during construction.

Construction activities and the presence of turbines and other Project features may disturb or displace birds. Many of the species detected during avian surveys likely breed in the Project area, and burrows/nests were found in the Project area for both burrowing owl and red-tailed hawk, suggesting potential for impact to breeding birds. However, overall impacts to regional populations of birds from Project-related disturbance or displacement of local breeders are likely to be low based on the relatively low avian use in the Project. Human impacts near and within the Project area already include the town of Searchlight, distribution and transmission lines, recreational off-highway vehicle (OHV) use along two-tracks, U.S. Highway 95, Cottonwood Cove Road, a Nevada Department of Transportation gravel pit, and several abandoned mines, and the majority of raptor stick nests detected during surveys were found on man-made structures despite the availability of cliff habitat. Thus, the additional disturbance of 388.5 acres, of which only 155.3 will be permanently disturbed, is may affect birds locally, but is unlikely to cause disturbance birds breeding regionally. The risk of disturbance/displacement will be further

reduced through avoidance and minimization measures taken during the design, construction, and operational phases of the Project (Sections 4-6).

5.3.1.4 Habitat Loss and Fragmentation

Habitat fragmentation can exacerbate the problem of habitat loss for birds by decreasing patch area and increasing edge habitat. Habitat fragmentation can reduce avian productivity through increased nest predation and parasitism and reduced pairing success of males. However, the increase in the amount of fragmentation as a result of Project construction will be minimized by using existing roads and OHV trails. Potential habitat fragmentation resulting from development of the Project will be reduced through avoidance and minimization measures taken during the design, construction, and operational phases of the Project (Sections 4-6). Additionally, at the end of the Project's life, the areas of permanent impact will be restored to their previous condition.

5.3.2 Eagles

5.3.2.1 Collision

Golden eagles are susceptible to wind turbine collisions. Although fatalities have been reduced at wind farms with newer generation turbines, golden eagle fatalities do still occur (Orloff and Flannery, 1992, Kerns and Kerlinger 2004, Kerlinger et al. 2006a). To date, 54 golden eagle fatalities have been reported for wind energy facilities (excluding Altamont Pass; Pagel et al. 2011). However, the presence of golden eagles does not equate to golden eagle fatalities when turbines are placed away from areas of high golden eagle use (Young et al. 2003).

Multiple seasons of avian surveys produced only 2 observations of golden eagles in fall 2007 (0.014 birds/20-min) for an overall use rate of 0.003 golden eagles/20-min (Tetra Tech 2010) indicating low use of the Project area by this species. This is supported by a comparison among seasonal use rates from other western wind facilities with pre-construction data (Figure 7). No bald eagles were observed during avian surveys, and neither bald nor golden eagles were observed during bald eagle monitoring in 2011 (Tetra Tech 2012). No golden eagle nests were detected within the Project area, and the nearest eagle nest was 4.3 miles from the Project area (Figure 5). Nesting eagles are unlikely to use the Project area based on research on golden eagle home range size and foraging distances in southwestern Idaho (Marzluff et al. 1997), which indicated that breeding golden eagles have an average maximum travel distance of 2.8 miles from the nest during the breeding season. Although prey densities in the Mojave Desert may be lower than in Idaho and could increase the distance traveled from nest during the breeding season, the lack of observations during the breeding season do not suggest the Project area receives high use. However, due to the lack of data regarding golden eagle home range size in the Mojave Desert, actual movement patterns are unknown.

Eagles might use the Project area during the non-breeding season based on research on golden eagle home range size and foraging distances in southwestern Idaho (Marzluff et al. 1997), which indicated that breeding golden eagles have an average maximum travel distance of 5.9 miles from the nest during the non-breeding season. Although prey densities in the Mojave Desert may be lower than in Idaho and could increase the distance traveled from nest during the non-breeding season, the few of observations during the non-breeding season do not

suggest the Project area receives high use. However, due to the lack of data regarding golden eagle home range size in the Mojave Desert, actual movement patterns are unknown.

New generation wind facilities in the west that have had golden eagle fatalities have typically had noticeably higher use rates than those recorded at the Project (Figure 7). Together, these results suggest that the risk of turbine collision at the Project is low for golden eagles, and nonexistent for bald eagles, assuming that use is proportional to risk.

The collision risk analysis uses a weight-of-evidence approach to estimate the risk of eagle fatalities at the Project. In the sections that follow, we use a comparative analysis of other western wind Projects that have pre-construction eagle use data and post-construction eagle fatality data.

5.3.3 USFWS Fatality Model Design

To estimate the potential number of annual golden eagle fatalities at the Project, Searchlight Wind worked with the USFWS to use the Bayesian analysis model recommended in the 2012 ECP Appendices (USFWS 2012). The risk of collision was modeled as the mean number of fatalities per year resulting from a Bayesian analysis of the input data, which assumes that risk is proportional to use (USFWS 2012). Bayesian models use existing information to estimate the statistical distribution (called prior probabilities in Bayesian analysis) of variables of interest in a hypothesis test, and then use new data to update the distribution. The USFWS Bayesian model attempts to predict collision risk at a wind farm based on the exposure of eagles to turbines as measured by point count surveys.

In this model, the total annual eagle fatalities (F) as the result of collisions with wind turbines are predicted as the product of the rate of eagle exposure (λ) to turbine hazards, the probability that eagle exposure will result in a collision with a turbine (C), and an expansion factor (ε) that scales the resulting fatality rate to all daylight hours over the entire project (equation 1).

$$F = \varepsilon \lambda C \qquad \text{Equation 1}$$

Within the Bayesian estimation framework, prior distributions for exposure rate and collision probability are derived by the USFWS from previous studies. The expansion factor is a constant based on the proportion of daylight hours and hazardous area around turbines that is sampled by the point counts. The analysis calculates the exposure posterior distribution from its prior distribution and observed point count data. The expanded product of the posterior exposure distribution and collision probability prior yields the predicted number of annual fatalities.

The exposure rate λ is the expected number of exposure events (eagle-minutes) per daylight hour per square kilometer (hr km^2). In the 2012 ECP Appendices (USFWS 2012), the USFWS defined the prior distribution for exposure rate for golden eagles based on information from a range of projects under USFWS review and others described with sufficient detail in Whitfield (2009). The posterior probability distribution for exposure is produced by the model using the prior distribution and the minutes of eagle exposure measured during point counts (t). The new posterior λ parameters are the sum of the mean of the prior distribution and the eagle minutes

observed (t), with the standard deviation of the posterior distribution determined by the number of point counts (N).

Collision probability (C) is the probability of an eagle colliding with a turbine given an eagle's exposure to turbine collisions (1 minute of flight in the hazardous area). For the purposes of the model, all collisions are considered fatal. The USFWS provided a prior distribution for this variable based on a Whitfield (2009) study of avoidance rates of golden eagles from four independent sites.

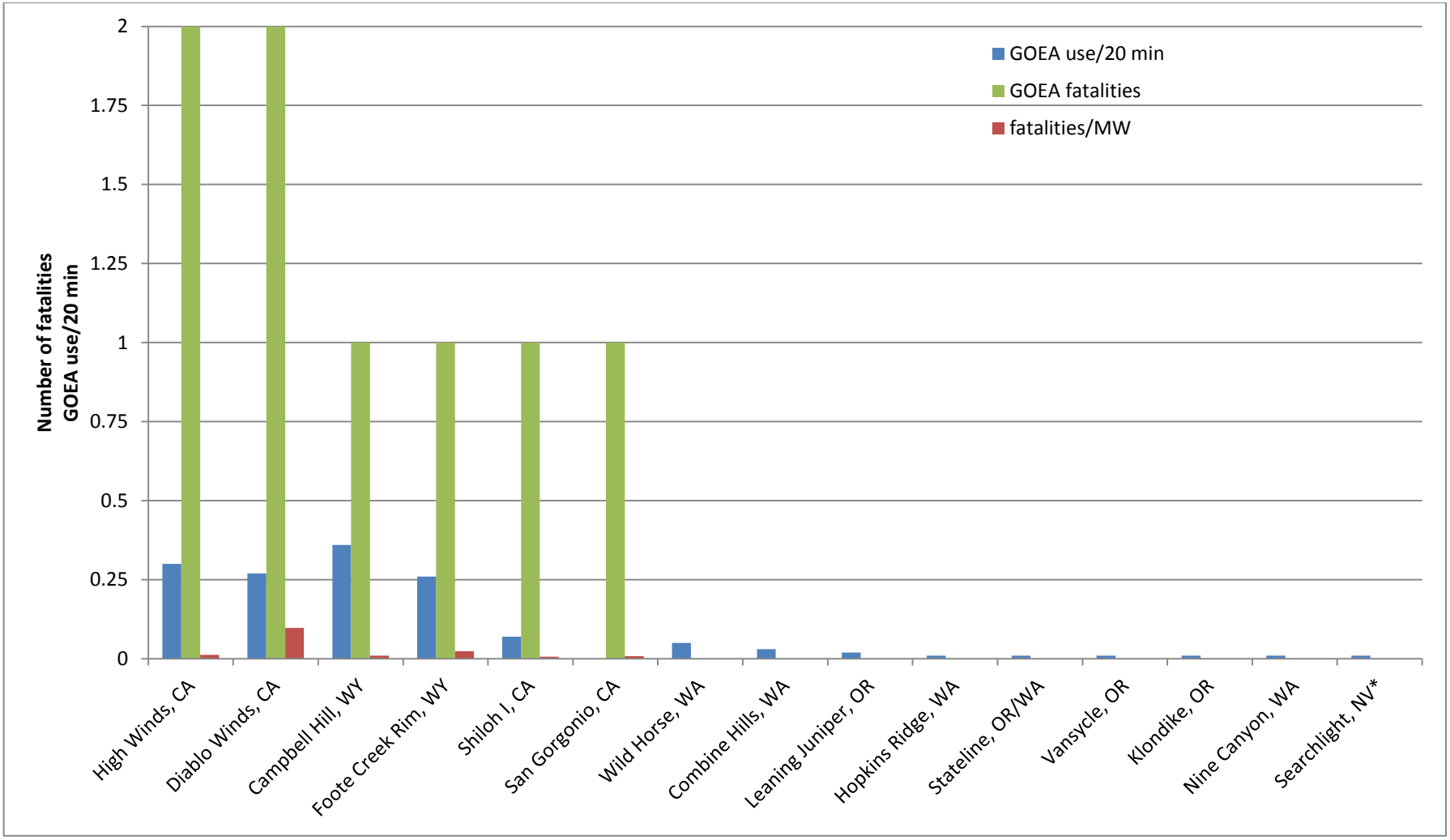
The expansion factor (ε) scales the resulting per-unit fatality rate (fatalities per hr-per km^2) to the daylight hours, τ, in 1 year (or other time period if calculating and combining fatalities for seasons or stratified areas) and total hazardous area (km^2) within the project footprint (equation 2):

$$\varepsilon = \tau \sum_{i=1}^{n_t} \delta_i \qquad \text{Equation 2}$$

where n_t is the number of turbines, and δ is the circular area centered at the base of a turbine with a radius equal to the rotor-swept radius of the turbine (USFWS defines this as the hazardous area surrounding a turbine). The model assumes both eagle use and hazardous area occur in 2-dimensional areas. The units for ε are hr·km^2 per year (or season).

To determine the distribution for the predicted annual fatalities, the exposure and collision risk distributions need to be multiplied by each other and expanded. The resulting distribution cannot be calculated in closed form so the model generates it through 100,000 simulations. The iterative calculation of annual fatality predictions, using eagle minutes of exposure as an input, was calculated according to equation 1 starting with the USFWS-provided, uninformative prior.

Using the Bayesian model described above, the USFWS estimates that one golden eagle fatality will occur every five years. This result represents a worst case scenario based on the turbines being operational during all daylight hours and does not reflect the anticipated turbine operational hours. Adjusting the daylight hours based on the likelihood of a turbine operating will result in a reduced fatality estimate. Searchlight Wind will work with the USFWS to provide data to adjust the daylight hours and produce a revised fatality estimate, which will be incorporated into a revised BBCS.



***Pre-construction use data only**

Figure 7. Mean Use by Eagles (Eagle Use/20 min; Pre-construction), Total Eagle Fatalities, and Eagle Fatalities/MW (Post-construction) at Wind Energy Projects in the Western U.S. Compared to Mean Use at the Searchlight Wind Energy Project

5.3.3.1 Electrocution

Fatalities of golden eagles have occurred as a result of electrocution and collisions with utility lines and structures, particularly distribution lines (APLIC 2006). Due to their large size, eagle species are able to bridge conductive elements to complete the circuit, and electrocutions of golden eagles are more common than bald eagle (Harness and Wilson 2001, APLIC 2006). However, the risk of eagle electrocution due to the Project is likely to be low because all collection lines will be buried where possible and design of overhead lines will follow APLIC guidelines.

5.3.3.2 Disturbance/Displacement

Bald eagles do not appear to use the Project area for foraging, nesting, or roosting based on avian, nest, and winter bald eagle surveys, thus risk of disturbance or displacement of bald eagles is expected to be negligible. Golden eagle disturbance or displacement is possible during construction or operation of the Project, particularly during the nesting season (February through July in Nevada). The potential for displacement or disturbance for eagles is somewhat offset by the background disturbance pre-existing in the Project area, which includes recreational uses such as OHV use, and local and highway traffic. Project construction may disturb golden eagles if they are nesting within line-of-sight of the Project or if the areas under active construction are preferred foraging areas. Project operations may disturb golden eagles if the presence of the operational turbines causes golden eagles to avoid using the Project area. However, evidence of fatalities at other wind farms suggests that golden eagles do not avoid operational facilities (Pagel et al. 2011). Recommendations for appropriate buffer distances to minimize disturbance vary by geographical location and by activity, but are not explicitly stated in current USFWS guidance (USFWS 2011a). Buffers based on research relative to nest disturbance range from 0.12 mile to 2 miles, with distances <1 mile being the most common recommendation (Table 11).

Few studies have examined raptor nest densities and nesting activity before and after project construction, and most of these have produced descriptive, rather than experimental data. Several studies conducted at western wind energy facilities produced somewhat equivocal results, but generally suggest that wind energy facilities do not displace nesting raptors or reduce nest densities post-construction (Erickson et al. 2003a, 2004; Johnson et al. 2003; Young et al. 2006; Gritski et al. 2008). For example, post-construction studies at the Leaning Juniper Wind Farm in Oregon suggest that raptor nests > 0.5 miles from turbines were not disturbed by the facility (Gritski et al. 2008), whereas other studies have found no clear relationship to distance from turbines (Johnson et al. 2003, Young et al. 2006), and some have suggested differences among species in their response to construction activities (Johnson et al. 2000a; Erickson et al. 2003a, 2004). However, most publically available studies are limited to one to two years of post-construction monitoring; therefore, inference is limited to short term effects.

Raptor and golden eagle nest surveys detected a total of 3 active golden eagle nests within a 10-mile radius of the Project area. The closest nest (#11) was 4.3 miles from the Project

boundary (nest #11; Figure 5). The view of the Project from nest #11 and #23 (10.0 miles from the Project boundary) will likely be partially if not completely blocked by topography. Nest #65, however, is within line-of-sight to the Project, but risk of disturbance is likely minimized by distance from the Project (10.2 miles). Golden eagles are unlikely to avoid using the Project area for foraging based on the presence of golden eagles as fatalities at wind energy projects (e.g., Smallwood and Karas 2009).

Table 10. Summary of Research or Policy-based Buffer Distances for Golden Eagles

Restrictions		Location	Activity	Notes	Reference
Spatial	**Temporal**				
Research-Based Literature					
1.0 mile	Unknown	CO and WY	Pipeline		Olendorff and Zeedyk 1978
0.19 mile	Winter	CO	Any	Approach distance within which 90% of birds flushed	Holmes et al. 1993
2 miles	All year	AK and Alberta	Pipeline	No construction	Jacobson 1974
2 miles	March 1 to September 1	AK and Alberta	Pipeline	No ground activity	Jacobson 1974
0.25 to 0.5 mile	Unknown	Unknown	General	Response to questionnaire provided to raptor experts	Fuller cited in Suter and Joness 1981
0.5 mile	Unknown	Unknown	General	Response to questionnaire provided to raptor experts	Howard cited in Suter and Joness 1981
0.12 to 0.31 miles	Unknown	Unknown	General	Response to questionnaire provided to raptor experts	Woffinden cited in Suter and Joness 1981
0.5 mile	February 1 to August 1	CO	Noise		Call 1979
0.31 to 0.5 miles	Any	Spain	Any	Imperial eagle, not golden eagle	Gonzalez et al. 2006
0.12 to 1 miles	March 1 to September 1	Western U.S.	Visual and audible disturbance		Suter and Joness 1981
Policy-Based Literature					
0.5 mile	February 1 to July 15	CO	Unknown		Craig 1995
0.6 mile	Unknown	UT	Geothermal drilling	No drilling	ERDA 1977
0.47 to 0.68 miles	Incubating and chick rearing period	United Kingdom	Any	Derived from a poll of expert opinion (n=32)	Ruddock and Whitfield 2007
0.19 miles	Breeding and winter	OR	Any	Buffer expected to prevent 90% of flushing	Watson and Whalen 2004
0.5 miles	January 15- July 31	WY	Wind energy	No disturbance	WGFD 2009

5.3.4 Bats

5.3.4.1 Collision

Bat mortality occurs at wind farms due to collisions with turbine blades and barotrauma (Kunz et al. 2007); barotrauma is the tissue damage to air-containing structures (lungs) that results from the rapid air-pressure reduction near moving turbine blades (Baerwald et al. 2008). Although studies of turbine-related bat fatality at wind energy sites are still in their infancy and comparisons among projects, particularly in the western U.S., are limited, migratory foliage- or tree-roosting bat species appear to be most susceptible to collision with wind turbines. These

species have experienced the highest fatality rates at wind energy facilities in North America, particularly during the late summer/early fall season when activity levels increase as these species migrate southward (Cryan 2003, Kunz et al. 2007, Arnett et al. 2008). Western-specific studies document *Myotis lucifugus, Lasiurus blossevillii*, *Lasiurus cinereus, Lasionycteris noctivagans*, *Eptesicus fuscus,* and *Tadarida brasiliensis* as fatalities during mortality surveys (Table 11). Few among these studies occurred within the range of *T. brasiliensis*, but of the 2 that did, *T. brasiliensis* averaged 63.5 percent of fatalities (Arnett et al. 2008). Specific details about the causal factors that influence high bat mortality at a particular wind farm remain unknown (Cryan and Barkley 2009).

Acoustic monitoring at the Project revealed the presence of 16 species of bats, including 4 which are commonly found as fatalities at wind projects (*L. cinereus, L. noctivagans, T. brasiliensis,* and *E. fuscus*). The relatively high species richness reflects the topographical diversity found at the Project, which includes a diversity of foraging and roosting habitats (O'Farrell 2010). The level of species richness may also be a result of intensive sampling over 2 full years, unlike many acoustic monitoring studies which are limited to certain seasons. In addition to the 4 species known to occur as turbine-related fatalities, 3 other high-flying species (*Eumops perotis*, *Nyctinopmops femorosaccus,* and *Nyctinomops macrotis*) were detected, and use at the Met High stations by various other species suggest some risk of collision to bat species using the Project area. Although the Project area contains attractant topographic and/or habitat features such natural springs and rocky outcrops, study results demonstrate that bats tend to move across the Project as if it were a landscape, generally moving toward Lake Mohave on a nightly basis for foraging and drinking. Overall bat use at the Project area can be described as low when compared to the potential bat activity at attractant features (e.g. washes). Although the data presented in Table 12 was collected at areas known to attract bats, it is provided as context for interpreting the bat activity (index of activity) in the Project area.

Table 11. Estimates of Mean Bat Fatalities Per Turbine and Per Megawatt at Wind Facilities in the Southwest or Arid Northwest

Wind Facility and State	Habitat	Estimated mean fatality/turbine/year	Estimated mean fatality/MW/year	Documented bat species fatalities
Biglow Canyon II, OR (Strickland et al. 2011)	Agriculture, Columbia Basin shrub-steppe	6.24	3.78	*L. cinereus*, *L. noctivagans,* unidentified *Myotis* spp.
High Winds, CA (Kerlinger et al. 2006a)	Agriculture, desert grasslands	3.63	2.02	*L. cinereus*, *T. brasiliensis, L. blossevillii, L. noctivagans*
Biglow Canyon I, OR (Jeffrey et al. 2009)	Agriculture, Columbia Basin shrub-steppe	3.29	1.99	*L. cinereus*, *L. noctivagans*
Nine Canyon, WA (Erickson et al. 2003a)	Agriculture, shrub-steppe, grassland	3.23	2.48	*L. cinereus*, *L. noctivagans*
Big Horn I, WA (Kronner et al. 2008)	Grassland, Agriculture	2.86	1.91	*L. cinereus*, *L. noctivagans, E. fuscus,* unidentified
Klondike III, OR (Gritski et al 2009)	Agriculture, Columbia Basin shrub-steppe	2.24	1.26	*L. cinereus*, *L. noctivagans, E. fuscus*
Elkhorn, OR (Jeffrey et al. 2009)	Agriculture, Columbia Basin shrub-steppe	2.07	1.26	*L. cinereus*, *L. noctivagans, M. lucifugus, E. fuscus*
Klondike, OR (Johnson et al. 2003)	Agriculture, Columbia Basin shrub-steppe	1.16	0.80	*L. noctivagans, L. cinereus*, unidentified *Myotis* spp.
Hopkins Ridge, WA (Young et al. 2007)	Agriculture, Mixed-grass prairie	1.13	0.63	*L. cinereus*, *L. noctivagans, E. fuscus, M. lucifugus*
Stateline, OR/WA 2003 (Erickson et al. 2004)	Agriculture, Columbia Basin shrub-steppe	1.10	1.70	*L. cinereus*, *L. noctivagans, M. lucifugus, E. fuscus*
Vancycle, OR (Erickson et al. 2000)	Agriculture, Columbia Basin shrub-steppe	0.74	1.12	*L. cinereus*, *L. noctivagans, M. lucifugus*
Stateline, OR/WA 2006 (Erickson et al. 2007)	Agriculture, Columbia Basin shrub-steppe	0.63	0.95	*L. cinereus*, *L. noctivagans*
Wild Horse, WA (Erickson et al. 2008)	Mixed grass prairie	0.70	0.39	*L. cinereus*, *L. noctivagans, M. lucifugus*

Table 12. Summary of Index of Activity (IA) from Acoustic Monitoring Results in Clark County, Nevada

Location	Total IA	*L. blossevillii*	*L. cinereus*	*T. brasiliensis*
Table Mountain *	75-345	0	1-11	1-83
Virgin River **	46,583	311	17	6,792
Halfway Wash **	17,420	44	0	1,986
Overton Wildlife Area **	254,487	29	128	63,456
LV Wash Downstream 2004 †	101,614	123	1,069	26,872
2005 †	76,134	13	296	32,065
LV Wash Midstream 2004 †	66,127	23	13	5,620
2005 †	28,594	240	9,852	4,353
LV Wash Upstream 2004 †	168,428	58	900	60,779
2005 †	95,305	85	258	43,706
Ash Meadows NWR 2007 ††	11,416	19	314	549
2008 ††	10,404	30	37	788
Searchlight Wind Energy Project‡				
MET 1 High 2008-2009	190	0	3	175
2009-2010	100	0	2	76
MET 1 Low 2008-2009	118	0	0.3	41
2009-2010	326	0.3	0.3	64
MET 3 High 2008-2009	117	0	3	83
2009-2010	119	0	1	102
MET 3 Low 2008-2009	333	0	1	137
2009-2010	497	0	1	146
MET 6 High 2008-2009	140	0	3	94
2009-2010	140	0.3	1	49
MET 6 Low 2008-2009	802	0	1	140
2009-2010	614	0	2	53
Stake 1 2008-2009	363	0	3	187
2009-2010	497	0.3	1	92
Stake 2 2008-2009	460	0	4	267
2009-2010	259	0	0	57
Stake 4 2008-2009	543	0	8	342
2009-2010	687	0	0.3	176
Total 2008-2009	2,985	0	26.3	1,466
Total 2009-2010	3,239	0.9	8.6	815

* O'Farrell 2007; values are the range for eight MET towers. Site considered devoid of conspicuous attractant features.
** O'Farrell 2006a; Halfway Wash considered devoid of conspicuous attractant features.
† O'Farrell 2006b
†† O'Farrell 2009b
‡ O'Farrell 2010; Project area considered devoid of conspicuous attractant features.

5.3.4.2 Disturbance/Displacement

Disturbance and displacement have not been identified as risks associated with bats and wind farms in reviews of bat/wind impacts (Kunz et al. 2007). The absence of concern with respect to wind development is likely due to the ability of bats to habituate to anthropogenic structures (Keeley and Tuttle 1999); however, one species detected at the Project, *M. thysanodes,* is known to be highly susceptible to human disturbance (O'Farrell and Studier 1980). There are known roosts at abandoned mine complexes within the Project as well as potential roosts within cliff-faces and rock crevices, both of which may be susceptible to human disturbance,

particularly during construction. The Project does have potential to disturb roosting habitat, but is less likely to disturb foraging habitat based on the lack of attractant features, the preference by some species to forage outside the Project, and the small area of permanent disturbance. This risk will be further reduced through measures taken during the design, construction, and operational phases of the Project (Sections 5.4, 6.1, 7.1).

5.3.4.3 Habitat Loss and Fragmentation

The impacts of habitat fragmentation from wind development on bats are not well-known (Kuvlesky et al. 2007). Both roosting and foraging habitat is available for several species of bats within the Project, but is mostly absent for other species (e.g. roosts for foliage-roosting bats, riparian foraging areas). Similarly, foraging habitat is less suitable for some species than areas outside of the Project like Lake Mohave. However, the Project has a relatively small footprint of temporary and permanent disturbance, and these areas are largely outside of suitable bat roosting and foraging habitat. Risk of habitat loss and fragmentation will be further reduced through measures taken during the design, construction, and operational phases of the Project (Sections 5.4, 6.1, 7.1).

5.4 Best Management Practices Implemented during Siting

Mitigation and minimization measures to avoid or significantly reduce impacts to avian and bat species that are incorporated into the planning and design for the Project (Table 13) are described in this section. These measures were derived from the USFWS (2011a) Draft Eagle Conservation Plan Guidance, the Searchlight Wind Energy Project DEIS (BLM 2011), and industry best management practices. The mitigation measures taken from the Project DEIS (e.g., MM-BIO or MM-VIS) are in draft form and will be updated accordingly when final measures are available. Measures derived from the DEIS (BLM 2011) include measures recommended or required by the BLM (e.g., MMVIS, MMBIO). BBCS measures are new measures proposed within this document. All mitigation measures proposed during the planning and design phase demonstrate and provide reliable and effective means to reduce impacts to avian and bat species and their habitats.

Table 13. Species that Would Benefit from Searchlight Wind Energy Project Avoidance and Minimization Measures During Project Planning and Design (with cross-reference to the Searchlight Wind Energy Project DEIS [BLM 2011])

Avoidance and Minimization Measures	Non-raptors	Raptors	Eagles	Bats	DEIS/BBCS Reference
Macro-siting			X		BBCS-1
Minimize Lighting	X	X	X	X	MMVIS-5
Transmission Line Design Following APLIC Guidelines	X	X	X	X	MMBIO-7
Collection Line Burial	X	X	X	X	BBCS-2
Bird Diverters on New Transmission Line	X	X	X		BBCS-3
Met Tower Design	X	X	X	X	BBCS-4

5.4.1 Macro- and Micro-siting

BBCS-1: Micro-siting to Avoid Eagle Impacts. Point count surveys indicate that golden eagles rarely fly through the Project (2 golden eagles seen flying in RSA in fall 2007, no eagles observed in any other survey season, Tetra Tech 2010). The Project was sighted in an area with a low density of golden eagle nests based on USFWS data and further confirmed by additional nest surveys (Tetra Tech 2011; Table 8).

5.4.2 Facility Design

MMVIS-5: Minimize Lighting**.** Efforts will be made to minimize the need for and amount of lighting on ancillary structures. When possible, lighting will be associated with motion sensors to minimize constant lighting effects. The only exterior lighting on the WTGs will be the aviation warning lighting required by the Federal Aviation Administration (FAA). The warning lighting will be the minimum required intensity to meet the current FAA standards. Outdoor night lighting at the O&M facility will be the minimum necessary for safety and security. All lights will be shielded to reduce offsite light pollution. Motion sensor lights will be used when possible.

MMBIO-7: Transmission Line Design. All overhead power lines will be designed using the Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006 manual (APLIC 2006) and Mitigating Bird Collisions with Power Lines: The State of the Art in 1994 (APLIC 1994).

BBCS-2: Collection Line Burial. Electrical collection lines will be buried underground to the extent practicable which will minimize bird collisions with the power lines.

BBCS-3: Met Tower Design. The permanent met towers (if needed) will be free-standing to avoid the collision risk associated with guy wires.

6.0 SITE CONSTRUCTION

6.1 Best Management Practices Implemented During Construction

This section identifies mitigation and minimization measures that will be incorporated during construction of the Project (Table 14). These measures were derived from the industry best management practices, the Searchlight Wind Energy DEIS (BLM 2011), and the USFWS Land-Based Wind Energy Guidelines USFWS (2012). These recommendations are thought to provide effective measures to reduce impacts to wildlife and their habitats during the construction of a wind energy facility. Measures derived from the DEIS (BLM 2011) include measures recommended or required by the BLM (e.g., MMWATER, MMBIO), as well as Applicant Proposed Measures (APM) which were voluntary measures proposed by Duke Energy Renewables. BBCS measures are new measures proposed within this document.

Table 14. Species that Would Benefit from Searchlight Wind Energy Project Avoidance and Minimization Measures During Construction (with cross-reference to the Searchlight Wind Energy Project DEIS [BLM 2011])

Avoidance and Minimization Measures	Non-raptors	Raptors	Eagles	Bats	DEIS Reference
Erosion Control	X				APM-1, MMWATER-2
Stormwater Pollution Prevention Plan	X	X	X	X	APM-4
Spill Prevention and Countermeasures Plan	X			X	APM-5
Waste Management Plan	X	X			APM-8
Weed Control Plan	X	X	X	X	APM-9
Develop BBCS	X	X	X	X	MMBIO-5
Avoid Bird Nesting Impacts	X	X	X		MMBIO-5
Burrowing Owl Survey		X			MMBIO-6
Minimize Lighting	X	X	X	X	MMVIS-5
Trash and Litter Control	X	X	X		BBCS-4
Carrion Control		X	X		BBCS-5
Annual Wildlife Training	X	X	X	X	BBCS-6
Speed Limits	X	X	X	X	BBCS-7
Monitoring of Overnight Hazards	X	X	X	X	BBCS-8
Environmental Manager	X	X	X	X	BBCS-9
Special-status Species Monitor	X	X	X	X	BBCS-10
Special-status Species Consultation	X	X	X		BBCS-11
Marking of Sensitive Areas	X	X	X	X	BBCS-12
Pre-construction Surveys	X	X			BBCS-13
Monthly Compliance Reports	X	X	X	X	BBCS-14
Minimize Disturbance Impacts	X	X	X	X	BBCS-15
Pesticide Use Per Recommendations	X	X	X	X	BBCS-16
Removal of Hollow Plastic Mine Markers	X				BBCS-17

The APMs, although not specific to wildlife, will provide broad benefits in the form of minimizing disturbance to the area. The APMs for construction are:

APM-1: Erosion Control

APM-4: Stormwater Pollution Prevention (SWPP) Plan

APM-5: Spill Prevention and Countermeasures Control (SPCC) Plan

APM-8: Waste Management Plan

APM-9: Weed Control Plan

In addition to the APMs, mitigation measures in the DEIS and provided in this document will further minimize impacts to wildlife.

MMWATER-2: Construction phase erosion and sedimentation control measures. The Applicant will develop and implement erosion and sedimentation control measures to be used to minimize impacts during the construction of the Project. At a minimum, this plan will include the following:

Implement soil stabilization measures to offset loss in vegetation including the following best management practices (BMPs):

- Install silt fences
- install temporary earthen berms,
- install straw bale barriers to reduce water velocity and flows,
- install temporary water bars,
- install sediment traps,
- install stabilized entrances from public roads to minimize track-out
- stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) as necessary;

Maintain or reduce salt yields originating from public lands to meet State-adopted and Environmental Protection Agency-approved water quality standards for the Colorado River (BLM 1998);

Implement BMPs, as identified by the state of Nevada, to minimize contributions from both point and non-point sources of pollution (including salts) from public lands (BLM 1998);

Ensure that any nonpoint source BMPs and rehabilitation techniques meet state and local water quality requirements (BLM 2005);

Implement BMPs such as locating waste and excess excavated materials outside drainages to avoid sedimentation;

Conduct regular site inspections during the construction period to see that erosion-control measures were properly installed and are functioning effectively;

Consider use of landscape for buffering, erosion control, and stormwater runoff control for maintaining acceptable water quality conditions (Clark County 2008);

Obtain and comply with necessary permits in accordance with the Clean Water Act Section 404 (dredge and fill) and Section 401 (water quality) from the USACE and NDEP (NDEP 2010; and

Implement adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site (any changes must be approved by the BLM).

MMBIO-5: Bird and Bat Conservation Strategy. A BBCS will be developed for the proposed Project. The BBCS will provide for pre-construction surveys, post-construction monitoring, and adaptive management measures. During pre-construction surveys, biological monitors will also

look for bird nests within the proposed Project area. If an active nest is located, Duke will notify BLM and/or NDOW to determine an appropriate buffer distance for avian species found, typically at around 30 m (100 feet) from the nest. As it is not possible to quantify effects on bats and birds based on pre-project surveys, post-construction monitoring will be implemented. The BBCS will define thresholds of adverse effects; for every threshold that is exceeded, a mitigation strategy will be employed.

MMBIO-6: Burrowing Owl Protection During Construction. For burrowing owls, biological monitors will use USFWS survey methods and mitigation measures presented in Protecting Burrowing Owls at Construction Sites in Nevada's Mojave Desert Region (USFWS no date specified).

MMVIS-5: Minimize Lighting. Efforts will be made to minimize the need for and amount of lighting on ancillary structures. When possible, lighting will be associated with motion sensors to minimize constant lighting effects. The only exterior lighting on the WTGs will be the aviation warning lighting required by the FAA. The warning lighting will be the minimum required intensity to meet the current FAA standards. Outdoor night lighting at the O&M facility will be the minimum necessary for safety and security. All lights will be shielded to reduce offsite light pollution. Motion sensor lights will be used when possible.

BBCS-4: Trash and Litter Control (also contained in MMBIO-3). Trash and food items will be disposed of properly in predator-proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes.

BBCS-5: Carrion Control: Dead animals or animal parts (e.g., gut piles or carcass remains) will be removed immediately to prevent the attraction of vultures, GOEAs or other scavengers.

BBCS-6: Annual Wildlife Training. See Section 9.2

BBCS-7: Speed Limits (also contained in MMBIO-3). A speed limit of 15 miles per hour will be maintained while on the construction site, access roads, and storage areas April 1 – May 30, and September 1 – October 31. Vehicular speed limits will not exceed 20 miles per hour during other times of the year.

BBCS-8: Monitoring of Overnight Hazards (also contained in MMBIO-3). No overnight hazards to wildlife (e.g., auger holes, trenches, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards would be eliminated each day prior to the work crew and biologist leaving the site. All excavations will be inspected for trapped wildlife at the beginning, middle, and end of the work day, at a minimum, but will also be continuously monitored by the authorized biologist. Should wildlife become entrapped, the authorized biologist will remove it immediately.

BBCS-9: Environmental Manager. See section 6.2.

BBCS-10: Special-status Species Monitor. Qualified biologists shall monitor all construction activities where prior surveys have documented the occurrence of one or more special status species. In conjunction with the Environmental Manager, the biologist shall have the authority to

halt all non-emergency actions that might result in harm to a special status species, and shall assist in the overall implementation of protection measures for such species during proposed Project operations. Emergencies are defined as situations or issues involving human health and safety.

BBCS-11: Special Status Species Consultation. If a special status species is located during construction, and a contingency for avoidance, removal, or transplant has not been approved by the appropriate agency, contractors and employees shall not proceed with the proposed Project activity until specific consultation with the appropriate agency is completed and work continuance has been approved by the appropriate agency.

All encounters with special status species shall be reported to the qualified biologist. The observer is responsible for providing the following information to the biologist, who shall record it:

Species name;
Location (narrative and maps) and dates of observations;
General condition and health, including injuries and state of healing; and
Diagnostic markings, including identification numbers or markers.

Upon locating a dead or injured special status species, an authorized biologist shall be notified. The biologist will notify the appropriate agency. Verbal communication to the wildlife agencies shall take place as soon as possible, and written notification must be made within 15 business days of the date and time of the finding or incident (if known). The notification must include: location of the carcass, a photograph, cause of death (if known), and other pertinent information such as corrective measures implemented to avoid future injury/death.

BBCS-12: Marking of Sensitive Areas. Prior to construction, environmentally sensitive areas (e.g., Joshua trees, aquatic resource areas, nests, etc.) that are to be protected in place and remain undisturbed during construction shall be staked, flagged, fenced, or otherwise conspicuously demarcated in the field.

BBCS-13: Pre-construction Surveys. A pre-construction survey of each proposed Project activity located within areas identified during surveys as special status species habitat shall be conducted by a qualified biologist no more than 7 days prior to the onset of activities.

BBCS-14: Monthly Compliance Reports. Monthly compliance reports shall be provided to the BLM during the construction phase of the proposed Project. Within 90 days of completion of construction, a post-construction report shall be prepared and submitted to the BLM. The report shall include photographs taken before, during, and after construction and a discussion of the proposed Project's compliance with the biological mitigation measures.

BBCS-15: Minimize Disturbance Impacts. Vegetation removal shall be limited to the minimum area needed to construct the proposed Project and shall be restricted in environmentally sensitive areas. During construction, travel and equipment staging shall be restricted to designated access roads and work areas to minimize vegetation disturbance. The extent of these areas shall be shown on the construction plans and clearly demarcated in the field with

stakes, flagging, or fencing. Any straying outside of the approved construction footprint shall be reported to the BLM as soon as possible after occurrence.

BBCS-16: Pesticide Use per Recommendation. Use of pesticides, herbicides, fertilizers, and other chemicals will be in strict accordance with federal and state laws.

BBCS-17: Removal of Hollow Plastic Mine Claim Markers. Upon detection of an uncapped hollow plastic mine claim marker found within the Project area, construction personnel will inform a Special Status Species Monitor or the Wildlife Coordinator, of the location of the marker. The Monitor or Coordinator will remove the marker and place it on the ground at the location from which it was removed.

6.2 Environmental Manager during Construction

BBCS-9: Environmental Manager. An Environmental Manager or Compliance Inspection Coordinator shall be hired by Duke Energy Renewables and be responsible for overseeing the proposed Project's environmental protection measures throughout the construction phase. At least one qualified biologist approved by BLM and USFWS shall also be available and responsible for identification of habitat and individual special-status species as needed during construction and operation. The biologists shall, if needed, hold the required permits or MOUs with appropriate Federal and State agencies for the survey for or handling of any listed species. The Environmental Manager shall be responsible for ensuring that Duke Energy Renewables and its contractors comply with environmental (including wildlife) laws and regulations, as well as monitor compliance with all avoidance and minimization measures. This includes posting signs and ensuring that workers respect sensitive biological areas, such as desert tortoise burrows and raptor nests.

7.0 POST-CONSTRUCTIONAL/OPERATIONAL PHASE

The purpose of post-construction monitoring is to compare data collected post-construction to data collected pre-construction in order to evaluate the effectiveness of mitigation measures, and assess fatalities. Additional objectives are to: 1) compare observed/corrected fatality rates to the assessed risk to species based on results of pre-construction surveys risk, and 2) determine if avoidance, minimization and mitigation measures were appropriate and adequate.

7.1 Best Management Practices during Operation

This section summarizes measures that will be taken to avoid and minimize impacts to wildlife during long-term operation of the Project (Table 15) and are applicable to operations and maintenance staff only.

The APMs, though not specific to wildlife will provide broad benefits in the form of minimizing disturbance to the area. The APMs during operation are:

APM-9: Weed Control Plan
APM-10: Site Rehabilitation Plan and Facility Decommissioning Plan

In addition to the APMs, mitigation measures in the DEIS and provided in this document will further minimize impacts to wildlife.

Table 15. Species that Would Benefit from Searchlight Wind Energy Project Avoidance and Minimization Measures during Operations (with cross-reference to the Searchlight Wind Energy Project DEIS [BLM 2011])

Avoidance and Minimization Measures	Non-raptors	Raptors	Eagles	Bats	DEIS Reference
Weed Control Plan	X	X	X	X	APM-9
Site Rehabilitation Plan	X	X	X	X	APM-10
Minimize Lighting	X	X	X	X	MMVIS-5
Trash and Litter Control	X	X	X		BBCS-4
Carrion Control		X	X		BBCS-5
Annual Wildlife Training	X	X	X	X	BBCS-6
Speed Limits	X	X	X	X	BBCS-7
Monitoring of Overnight Hazards	X	X	X	X	BBCS-8
Environmental Inspector	X	X	X	X	BBCS-9
Pesticide Use Per Recommendations	X	X	X	X	BBCS-16
Removal of Hollow Plastic Mine Markers	X				BBCS-17
Prohibit Pets	X	X	X	X	BBCS-18
Annual Biological Report	X	X	X	X	BBCS-19
Minimize Wildfire Potential	X	X	X	X	BBCS-20
Disposal of Carcasses		X	X		BBCS-21

MMVIS-5: Minimize Lighting. Efforts will be made to minimize the need for and amount of lighting on ancillary structures. When possible, lighting will be associated with motion sensors to minimize constant lighting effects. The only exterior lighting on the WTGs will be the aviation warning lighting required by the FAA. The warning lighting will be the minimum required intensity to meet the current FAA standards. Outdoor night lighting at the O&M facility will be the minimum necessary for safety and security. All lights will be shielded to reduce offsite light pollution. Motion sensor lights will be used when possible.

BBCS-4: Trash and Litter Control (also contained in MMBIO-3). Trash and food items will be disposed of properly in predator-proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes.

BBCS-5: Carrion Control: Dead animals or animal parts (i.e. gut piles or carcass remains from harvested big game) will be removed immediately to prevent the attraction of vultures, GOEAs or other scavengers.

BBCS-6: Annual Wildlife Training. See Section 9.2

BBCS-7: Speed Limits (also contained in MMBIO-3). A speed limit of 20 miles per hour during operation with further restriction to 15 mph April 1- May 31, and September 1- November 1.

BBCS-8: Overnight Hazards (also contained in MMBIO-3). No overnight hazards to wildlife (e.g., auger holes, trenches, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards will be eliminated each day prior to the work crew and biologist leaving the site. All excavations will be inspected for trapped wildlife at the beginning, middle, and end of the work day, at a minimum, but will also be continuously monitored by. Should wildlife become entrapped, the authorized biologist will remove it immediately.

BBCS-9: Environmental Inspector. See Section 10.5

BBCS-16: Pesticide Use per Recommendation. Use of pesticides, herbicides, fertilizers, and other chemicals will be in strict accordance with federal and state laws.

BBCS-17: Removal of Hollow Plastic Mine Claim Markers. Upon detection of an uncapped hollow plastic mine claim marker found within the Project area, construction personnel will inform a Special Status Species Monitor or the Wildlife Coordinator, of the location of the marker. The Monitor or Coordinator will remove the marker and place it on the ground at the location from which it was removed.

BBCS-18: Prohibit Pets. Domestic pets shall be prohibited from proposed Project work areas.

BBCS-19: Annual Biological Report. An annual report shall be submitted to the BLM, NDOW, and USFWS discussing continued implementation of biological mitigation measures.

BBCS-20: Minimize Wildfire Potential. Fire prevention measures will be implemented during operation to minimize wildfire potential.

BBCS-21: Disposal of Road-killed Animals and Other Carcasses. Road-killed animals or other carcasses (non-bird) detected by personnel on or near roads within the Project will be reported and removed promptly to avoid attracting eagles and other raptors to the Project

7.2 Proposed Fatality Monitoring Study (Tier 4a)

7.2.1 Avian and Bat Fatality Study

The primary objective of the fatality monitoring study is to estimate avian and bat mortality at the Project and determine whether the estimated mortality is lower, similar, or higher than the average mortality observed at other regional projects or if species of concern are impacted. The monitoring study will begin after all the turbines in each phase are fully operational. The study will be conducted for two years, followed by a Technical Advisory Committee (TAC) review of findings and recommendations on additional monitoring. Twenty-six turbines will be searched. Searches are proposed to be conducted weekly during the spring and fall migration and every 10 days during the remainder of the year. Experimental bias trials will be conducted to account for searcher efficiency and carcass removal rates. More details of the fatality monitoring protocol can be found in Appendix B.

The scope and duration of the fatality monitoring study was developed to be consistent and within the range of monitoring programs that have or will be conducted at other wind projects in the western United States. The proposed methods for estimating avian and bat mortality from

the Project: 1) conform to the industry standard in the western US; 2) provide much more accurate and less variable estimates of avian and bat mortality, especially during migration seasons, due to increased frequency of surveys; and 3) will provide the NDOW and USFWS with good baseline data on avian and bat fatality rates at the Project.

7.3 Role of Technical Advisory Committee

A Technical Advisory Committee has been established to act as an advisory group on the wildlife post-construction monitoring studies. The TAC is comprised of representatives from BLM, USFWS, NDOW, and Duke Energy Renewables. The TAC will review the technical procedures of the monitoring studies, assess the scientific findings, and recommend various practices or measures, as necessary, to Duke Energy Renewables.

The TAC's responsibilities include the following:

Reviewing and commenting on the raptor nest study;
Reviewing and commenting on the avian and bat fatality monitoring study;
Reviewing and commenting on the avian point count and bat acoustic monitoring studies;
Providing input to Duke Energy Renewables on additional monitoring needs, adaptive management and mitigation, based on the post-construction monitoring results and fatality estimates.

The TAC will use a collaborative process to reach understanding and consensus on reviews and recommendations. The TAC does not replace regulatory authority or responsibility of the various agencies or groups. A third-party coordinator may assist Project with planning and arrangements for meetings, and with briefing and reporting to TAC members.

Duke Energy Renewables will submit quarterly fatality updates to the TA for up to three years of post-construction, including prior to commencement of formal mortality monitoring. In addition to reporting mortality monitoring progress, the quarterly fatality updates will inform of large bird and/or bat fatalities detected by Project personnel outside of established dates of formal mortality monitoring. In addition, an annual report of findings will be prepared at the end of each year of monitoring and will be distributed to the members of the TAC. The TAC will meet after the first monitoring report is submitted to discuss the results. The need for further study or changes to the current protocol will be based on reasonable criteria proposed by the TAC. A final report on study results will be submitted to the TAC, as appropriate, for review and subsequent discussion on mitigation recommendations.

Draft meeting minutes will be completed within two weeks of each meeting. Minutes will be forwarded to TAC members for review and comment. Minutes will be approved and finalized at the subsequent meeting. Depending on the group's preferences, meetings may be in person or by conference call. Monitoring findings (summarized per season or semi-annually) and other pertinent information (unusual findings or events) will be transmitted via hard copy, e-mail, or phone call, as necessary.

7.4 Adaptive Management

Duke Energy Renewables has implemented adaptive management at the Project throughout the pre-construction baseline data collection, siting, construction and operation planning, and planning of post-construction monitoring efforts. Duke Energy Renewables, in coordination with the BLM, NDOW, and the USFWS, has used the results of the baseline wildlife studies to implement wildlife avoidance measures (e.g., setbacks and timing stipulations). Duke Energy Renewables has also implemented BMPs during siting, and will continue to do so during construction, and operation of the Project. The effectiveness of the management decisions made to date (e.g., siting decisions, wildlife avoidance measures, and BMPs) will be evaluated throughout the Tier 4 post-construction monitoring efforts.

Adaptive management will focus on 'species of concern' as identified in the Wind Energy Guidelines. Species of concern refer initially to those with special status designation and are identified in Tables 4 and 6. However, if fatalities resulting from the Project operation are determined to significantly affect a species not identified in Tables 4 and 6, it will be considered a species of concern; and adaptive management measures will be implemented. Depending on the results of the Tier 4 post-construction monitoring studies, no further action may be warranted if impacts are negligible and/or determined to be at an acceptable level. If impacts are determined to be at an unacceptable level, an assessment of why impacts are occurring will be conducted to aid in developing appropriate actions to further avoid, minimize or mitigate the impacts. If causation for impacts is unknown, further monitoring efforts may be implemented to help understand impacts. The determination of acceptable level of impact will be discussed by the TAC. The TAC will help to determine the appropriate mitigation measures to implement to address impacts. Once measures to avoid, minimize and mitigate impacts are put into place, additional monitoring to determine the effectiveness of these measures will be conducted, and, depending on the results, further remedial measures may/may not be necessary.

Based on the Tier 3 pre-construction evaluation and design measures implemented during siting, construction, and operation, Duke Energy Renewables anticipates the impacts to birds and bats will be low. Based on the anticipated impacts, Duke Energy Renewables has developed a suite of adaptive management measures to avoid, minimize and mitigate impacts to birds and bats particularly as a result of turbine related fatalities. The objective is to provide a 'basket' of options from which the TAC can select to address higher than expected impacts to species of concern. The potential adaptive management measures to avoid, minimize and mitigate impacts include:

<u>Curtailment</u>

- Curtailment will be considered if, after 2 years of PCMM data, significant temporal or spatial patterns of fatalities of species of concern are detected. Data will be evaluated to determine if there are specific time periods or turbines when larger numbers of fatalities are detected. A large fatality event will be subjective, but by using both years of data, we can determine if the pattern is consistent.

- If specific time periods or turbines have higher than normal fatalities, curtailment during those periods or at specific turbines will be implemented.
    - For bat species of concern – cut-in speed will be increased to 5.0 m/s during identified times or turbines from dawn until dusk and will not exceed 500 hours of cut-in speed curtailment.
    - For bird species of concern – shutdown curtailment will be developed to address large fatality events at specific turbines, time periods or weather conditions and will not exceed 500 hours of shutdown curtailment.

Other Technologies

- Other technologies will be evaluated and considered. Technologies such as radar, cameras, visibility monitors, acoustic deterrents (for bats) or a combination of such technologies will be evaluated to determine their efficacy for the specific issue.

7.4.1 Eagles

Searchlight Wind has taken several steps to reduce risk to golden eagles (see Tables 13-15 above), and based on the weight of evidence from field data, fatalities are predicted to be low. However, due to the uncertainty of these types of estimates, Searchlight Wind will adaptively manage potential impacts. During the first two years of operation in conjunction with the Tier 4a mortality studies, eagle use surveys will be conducted following the methods described in the Eagle Conservation Plan Guidance Technical Appendices (USFWS 2012b). If golden eagle use increases significantly, Duke Energy Renewables will notify BLM, USFWS, and NDOW for coordination. Collectively, a plan will be implemented to try to determine the cause of the increased eagle use and if this increase in use is presenting a higher risk to golden eagle. If a golden eagle fatality occurs, Searchlight Wind will notify BLM, USFWS, and NDOW within 24 hours and will work with the TAC to determine the appropriate adaptive management strategies to be implemented. Searchlight Wind will follow the steps outlined in Table 16 to address adaptive management of eagles.

7.4.2 Other Birds

After the completion of post-construction mortality monitoring, a report summarizing the number and species found as fatalities; the estimates of total fatalities for the Project adjusted for carcasses removal rates and searcher efficiency; and any incidental fatality observations will be provided to the TAC. The TAC will review this report and provide guidance to Searchlight Wind LLC on whether additional years of post-construction mortality monitoring surveys or species-specific mitigation are recommended based on the observed fatality rates.

7.4.3 Bats

After the completion of post-construction mortality monitoring, a report summarizing the number and species found as fatalities; the estimates of total fatalities for the Project adjusted for carcasses removal rates and searcher efficiency; and any incidental fatality observations will be provided to the TAC. The TAC will review this report and provide guidance to Searchlight Wind LLC on whether additional years of post-construction mortality monitoring surveys or species-specific mitigation are recommended based on the observed fatality rates.

Table 16. Summary of Advanced Conservation Measures using a Step-wise Approach: to be implemented when eagle take occurs

Step	Advanced Conservation Measures	Threshold or Trigger
Step I	Initiate consultation with the TAC to illuminate appropriate conservation measures to minimize likely hood of existing take. Mortality monitoring, using approved protocol for 3 consecutive years.	One eagle taken.
Step II	Initiate advanced conservation measures involving visual and/or auditory deterrence procedures and consultation with TAC to design a protocol to evaluate effectiveness of these methods. Intensify eagle monitoring studies to define seasonal and diurnal flight patterns within the project area to inform development/ implementation of future ACPs. Conduct three years mortality monitoring to evaluate effectiveness of deterrence methods.	Two eagles taken within any 12 month period or three eagles taken within a 5 year period.
Step III	Biological Monitors or a radar system(s) will be employed on site during day light hours and have the ability to curtail turbine(s) when an eagle/large raptor approaches the RSA. A sufficient number of qualified monitors/ radar units will be stationed throughout the site, so as to provide unimpeded views of eagles/large raptors that may approach within one mile of any turbine. Additionally, monitors will be employed to report/remove carrion located on site and report any eagle take. Initiate consultation with TAC to refine and evaluate the curtailment protocol utilizing data from monitoring efforts initiated in Phase II Extend or reinitiate eagle movement studies and mortality monitoring by three years.	Three eagles taken within any 12 month period or four eagles taken within any 5 years period.
Step IV	Deploy radar system(s) designed to curtail turbine blade rotation as eagle(s)/large raptors approach. In consultation with the TAC design and implement a protocol for determining the effectiveness of a radar system(s). Conduct a minimum of three years mortality monitoring to evaluate effectiveness of radar system at reducing eagle take.	Four eagles taken within any 12 month period or five eagles taken within any 5 years period.
Step V	In consultation with the USFWS and BLM, determine other appropriate actions necessary to minimize and compensate for additional impacts to eagle populations.	Five eagles taken within any 24 month period or six eagles taken within the first 5 years of operations.

7.5 Other Proposed Post-Construction Studies (Tier 5)

7.5.1 Golden Eagle Nests

Searchlight Wind will monitor the activity of golden eagle nests during construction and for 2 years following construction to determine the occupancy and productivity of golden eagles nesting within the vicinity of the Project. Follow up nest monitoring surveys will include coverage of the entire Project area in order to locate and document nesting activity that may have been missed during initial surveys or can be attributed to new golden eagle pairs or existing pairs that have moved to a new nesting location. The follow up survey will be conducted by helicopter given the limited access and topography. Two confirmed golden eagle nests and 1 probable golden eagle nest located in 2011 will be visited during construction and post-construction. The nest monitoring effort is to provide data for the USFWS and NDOW and is not intended to determine if the Project affects golden eagle nesting. Golden eagles might not nest every year and nesting activity is driven by rainfall and food availability. If available, and in lieu of post-construction nest monitoring, Searchlight Wind will provide monetary support for a larger-scale research effort that addresses golden eagle nesting success.

7.5.2 Bird Point Counts

Post-construction bird point count surveys will be conducted for two years to develop an understanding of bird activity patterns and how they relate to bird fatality patterns. Counts will be conducted at points 1, 2b, 3a, 6, 8, 19, 14a, and 16, which occur in areas of turbine development. Surveys will be conducted in the spring and fall following the same methods used to collect pre-construction data.

7.5.3 Bat Acoustical Monitoring

Post-construction bat acoustic surveys will be conducted for two years to develop an understanding of bat activity patterns and how they relate to bat fatality patterns. Acoustic detectors will be placed on two Met towers, one in the northern area (Met 6) of the project and southern end of the project area (Met 3). If these Met towers are removed, alternative sampling locations will be selected. Data will be collected using the same methods used to collect pre-construction data. After a year of post-construction bat activity and bat fatality monitoring, the TAC will review the results to determine if a second year of acoustic monitoring surveys is warranted. However, at this date, the conditions that would warrant a second year of surveys have not yet been determined.

8.0 REPORTING

8.1 Pre-Construction

Duke Energy Renewables has met with the BLM, NDOW, and USFWS on multiple occasions since 2008 to discuss proposed baseline wildlife study protocols, wildlife study results, implications for Project impacts to wildlife and habitats, and potential mitigation measures (Table

1). In addition, results of the final wildlife baseline study efforts were made publicly available within the DEIS (BLM 2011).

8.2 Construction

Monthly compliance reports shall be provided to the BLM during the construction phase of the proposed Project. Within 90 days of completion of construction, a post-construction report shall be prepared and submitted to the BLM (BBCS-14). The report shall include photographs taken before, during, and after construction and a discussion of the proposed Project's compliance with the biological mitigation measures.

8.3 Post-Construction

An annual report shall be submitted to the BLM, NDOW, and USFWS discussing continued implementation of biological mitigation measures (BBCS-18). Fatality summaries will be provided seasonally to the TAC.

9.0 TRAINING OF PERSONNEL

9.1 New Employee Orientation Program

The workforce at the Project is required to attend a new employee orientation program. Employees are provided information to enhance wildlife awareness, minimize impacts to wildlife, and understand their role in compliance with the Project permit conditions and commitments. Additionally, personnel are instructed on what to do when encountering dead or injured wildlife.

9.2 Annual Wildlife Training (BBCS-6)

All wind site personnel and contractors, except temporary contractors that are escorted by trained personnel, are required to have Duke Energy's Wildlife Incident Monitoring and Reporting System training (see Section 10; BBCS-6). This training is based on the Migratory Bird Treaty Act training given to Duke Energy generation and distribution employees but has been tailored to the special needs of the wind sites. The training will consist of an initial instructor led training with an annual refresher CBT. Instructor led training will be required every three years or as necessary. Special emphasis will be placed on protection measures developed for the desert tortoise and the consequences of non-compliance. Written material will be provided to employees at orientation and participants will sign an attendance sheet documenting their participation.

Wildlife Coordinators and Operations technicians (those performing the turbine surveys) will be required to have instructor-led field training. This will consist of on-the-job training with a Duke Energy Scientific Services biologist and the Operations technician performing turbine surveys in the field.

10.0 WILDLIFE INCIDENT MONITORING AND REPORTING SYSTEM (WIMRS)

The Wildlife Incident Monitoring and Reporting System (WIMRS) has been developed to provide the Duke Energy Renewables operating wind facilities with the tools to support a responsible wildlife management program through adaptive management measures as necessary to reduce impacts (see Section 7.4). WIMRS is not a static program but will evolve as information is provided by the site personnel and the wind industry on data collection methods, frequency of surveys, and the value provided by the program to the wind site and the industry in general.

WIMRS, through operational monitoring is intended to build on the baseline of data provided by post construction monitoring. The data gathered through WIMRS provides further information on trends, approximations on the number of fatalities, the location of those fatalities and the overall species composition of the wildlife at risk. This information will provide data to allow the wind sites to adapt to wildlife issues and prevent them in the future.

Operational monitoring is a series of long-term (five-year increments) standardized surveys using Operations personnel. It systematically monitors and reports wildlife fatalities and incidents to assess long-term operational impacts (trends) of the Project. At approximately five-year intervals, an analysis of trends will be conducted to assess impacts of the Project and evaluate the value of continued monitoring.

The surveys will consist of both incidental observations as well as structured observations timed to coincide with the sites Spill Prevention, Control and Countermeasures (SPCC) inspections. They will be tracked through an in-house environmental data management system using an electronic incident reporting form (Appendix C). Information will be gathered using GPS, cameras, trained operations technicians, and Duke Energy Environmental Services biologists and biological consultants.

10.1 Wildlife Coordinator

A key resource for implementation of the operational monitoring is the onsite operations technician that is designated as the Wildlife Coordinator (WC) or Wildlife Lead. The WC acts as the on-site environmental representative for wildlife issues and implementation of the WIMRS at the site. The duties of the WC include supporting the Site Manager and Operations personnel with wildlife related issues at the Project. The WC will work with a Duke Energy biologist or the EHS Coordinator on wildlife issues. Over time, the WC will be trained and become more familiar in bird and bat identification, reporting, and other procedures to comply with state and federal permits. The WC will be supported with various job aids and access to technical assistance from Duke Energy biologists or biological consultants.

Duke Energy biologists or biological consultants shall coordinate the reporting and collection of state endangered, threatened, sensitive, or other state-protected species with local wildlife agencies. Duke Energy biologists or biological consultants shall coordinate the reporting and collection of federally listed endangered or threatened species and Migratory Bird Treaty Act protected avian species with the USFWS.

The WC will obtain a scientific collecting permit for the project so that bat carcasses found as fatalities can be collected and used in trails (see Appendix B).

10.2 Voluntary Operational Monitoring Reporting Criteria

Depending on the type of incident, reporting may simply consist of a WIMRS report. The following criteria should be used to determine whether a Wildlife Hotline (refer to section 10.7 for Wildlife Hotline numbers) call is necessary or not:

Note: Handling of dead birds is prohibited unless the site has first obtained all necessary State and Federal permits. Handling of any dead birds (if permitted) or bats should be done with proper PPE (gloves).

Call the Wildlife Hotline for the following incidents (all incidents should be reported to the site manager and wildlife coordinator):

Dead or injured eagles, raptors or owls,
Any uncertainty about a rare, threatened, endangered, or species of concern (RTE),
A dead or injured RTE,
A sighting of an RTE that is not commonly seen on the site,
More than 3 dead or injured birds or bats found at a single turbine,
Any large scale fatality event at the site, e.g. 5 or more fatalities site wide,
Newly constructed raptor nests,
Old, historically inactive raptor nests that have recently become active,
Raptor activity at raptor nest structures or other manmade habitat enhancements.

Complete the WIMRS form and submit with photographs for the following wildlife incidents (all incidents should be reported to the site manager and wildlife coordinator):

Incidental bird and bat fatalities, defined as a single fatality that does not meet a requirement described above,
Observations of fox or coyote dens, prairie dog towns (that didn't exist before), active nests that are not hazardous to operations, etc.

10.3 Incidental Observations

All personnel shall be familiar with the wind site and the wildlife that may be expected on the site. All travels on the site and visits to wind turbines should include a visual scan of the area keeping an eye out for dead birds or bats. Turbine visits should include a visual scan of the gravel area and access road. When conditions permit (no crops or other vegetation blocking view) a visual scan of the surrounding area should also be performed.

Large raptors and eagles are generally easy to spot and require immediate reporting to the Wildlife Hotline. All bats and smaller birds should be reported to the site manager, the WC and the WIMRS reporting process per the guidance above.

10.4 Turbine Surveys

Trained Operations technicians will perform a pad check during monthly SPCC inspections. This will consist of a check around the turbine pad, transformer and access road. Turbine surveys should be more thorough than incidental observations. Large raptors and eagles should be reported to the Wildlife Hotline as soon as possible. All bats and smaller birds should be reported to the site manager, the WC and the WIMRS reporting process per the guidance above.

The recommended method of performing a turbine survey is to walk around the base of the turbine, the transformer, the outside edge of the pad and approximately 60 meters of the access road. A visual scan should be performed to approximately 4 meters on the outside of the pad and both sides of the road.

Always ensure safety prior to performing the pad check. All turbines generally have an open area that can be searched with little difficulty. Technicians need not walk through brambles, briars; risk a snake encounter or other site hazards. Seasonal hazards (e.g. ice) may make some turbines too dangerous to search and some areas may be considered unsearchable for safety reasons.

Note that turbine surveys will not begin at a wind site until post-construction monitoring is complete. However, incidental observations by site personnel will be performed. Incidental finds are an important part of the post-construction monitoring.

10.5 Environmental Services Inspections (BBCS-9)

A biologist from Duke's Environmental Services group may inspect the turbines. Some sites will be inspected more frequently depending on data gathered through the incidental observations, turbine checks or other wildlife issues/incidents at the site. These inspections will be more thorough and formal than the regular turbine checks. Protocols for these inspections will follow best practices and standards as prescribed by state and federal agencies and the wind industry.

10.6 Poster

In addition to formal training, Project buildings will have a poster (Appendix D) displayed in prominent places. The purpose of this poster is to remind employees of their personal responsibility and the corporation's responsibility to comply with migratory bird and other wildlife-related laws. Posters also list a phone number to call for assistance when encountering avian or bat issues.

10.7 Contact Information

The Wildlife Hotline should be contacted per the reporting criteria given above.

Greg Aldrich (704) 430-7946 (call or text)
(Primary Contact)

Scott Fletcher (704) 956-1315
(Secondary Contact)

The Duke Energy Renewables' reporting process is documented in a flowchart (Appendix E). Each employee receives detailed instruction on the process when trained and receives a copy of the flowchart.

11.0 INTERNAL AUDITING

Project will be subjected to auditing by Duke Energy Corporate EHS auditing group. This group will audit various aspects of the Project by examining training records, ensuring posters are visible, and quizzing employees about their knowledge of bird and bat reporting requirements. This audit may also include examination of the record keeping of reported bird mortalities. Any audit findings will follow Duke Energy Corporate EHS audit procedures that include follow-up and corrective action measures.

12.0 PUBLIC OUTREACH AND EDUCATIONAL PLANS

It is continually important that Duke Energy Renewables operates its facilities in an environmentally responsible manner. This includes siting, engineering, constructing, and operating its electric generation system in a manner that minimizes its impact on wildlife. Fatalities or injuries of birds or bats, or public displays of indifference toward wildlife by Duke Energy Renewables employees, will not be tolerated by Duke Energy Renewables or the public, and could result in negative media coverage and/or regulatory action by the agencies. This is particularly true with high-profile raptors, such as golden eagles, and hawk and owl species. During migratory bird training sessions, instructors discuss public awareness issues with Duke Energy Renewables employees. Examples of how to effectively handle high-profile bird problems are discussed.

Duke Energy Renewables will continue to strive to educate the public on the benefits of renewable wind energy. This may include partnerships with local academia to develop educational programs related to wind energy facilities. Duke Energy Renewables may allow tours or field trips with local schools, host open houses, and/or invite the public for visits to Project. Duke Energy Renewables may distribute material in the media, such as local newspapers or radio stations. In addition, Duke Energy Renewables will strive to continue to work closely with resource agencies, conservation organizations, the media, and the general public on bird and bat conservation projects.

13.0 KEY RESOURCES

Key avian and bat resource personnel involved with Searchlight include the following:
Tetra Tech EC, Inc.
Karl Kosciuch, PhD
Senior Biologist and Project Manager
Cell Phone: 503-432-7093

Duke Energy Migratory Bird Hot Line for Wind Sites
Greg Aldrich (704) 430-7946 (call or text)

United States Fish and Wildlife Service (USFWS) - Office of Law Enforcement
USFWS Region 8 (CA and NV)
Office of Law Enforcement
2800 Cottage Way, W-2928
Sacramento, California 95825
Phone: 916-414-6660 Fax: 916-414-6715

USFWS - Southern Nevada Field Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
702-515-5230

USFWS - Nevada Fish & Wildlife Office
1340 Financial Blvd., Suite 234
Reno, Nevada 89502
(775) 861-6300

Nevada Licensed Bird Rehabilitators Near Searchlight:
Donald Inskeep
126 Crestview Dr
Las Vegas, NV 89124
Phone: 702-872-9309

Lisa Ross - Wild Wing Project
4232 Tuffer Ln
Las Vegas, NV 89130
Phone: 702-238-0570

Joanne Stefanatos - Animal Kingdom Veterinary Hospital
1325 Vegas Valley Dr
Las Vegas, NV 89109
Phone: 702-735-7184

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APPENDIX A. SITE-SPECIFIC PRE-CONSTRUCTION DATA

APPENDIX B. FATALITY MONITORING PROTOCOL

FATALITY MONITORING PROTOCOL

1 TECHNICAL APPROACH

The objective of post-construction mortality monitoring at the Project is to study the avian and bat mortality associated with Project operation over the course of two years. Wind farm-related fatality estimation is based on the number of carcasses found during carcass searches conducted under operating turbines. Both the probability that a carcass persists onsite long enough to be detected by searchers (carcass persistence), and the ability of searchers to detect carcasses (searcher efficiency) can lead to imperfect detection of carcasses during standardized searches. In other words, not all birds or bats killed are found, thus fatality estimates are biased. Therefore, this post-construction monitoring plan includes: 1) methods for conducting standardized carcass searches to monitor potential injuries or fatalities associated with wind farm operation; 2) carcass persistence trials to assess seasonal, site-specific carcass persistence time; and 3) searcher efficiency trials to assess observer efficiency in finding carcasses. Annual fatality rates of bats, large birds, and small birds will then be calculated by correcting for the bias (i.e., underestimation) due to searcher efficiency and carcass persistence.

The field and analytical methods proposed below are consistent with post-construction monitoring being conducted, or proposed, for other wind projects elsewhere in the U.S. (Johnson et al. 2003; Young et al. 2003; Erickson et al. 2004; Arnett et al. 2005, 2009a, 2009b; Kerns et al. 2005; Jain et al. 2007; Huso 2011) but have been adapted to the specific characteristics of the Project. The protocol outlines the surveys and trials to be conducted. Methods and timing outlined in this protocol may be modified over the course of the study year as Project-specific information is gained to maximize the effectiveness and efficiency of the monitoring program (e.g., search interval, number of turbines searched, plot size).

A scientific collecting permit will be obtained from NDOW so that bat carcasses can be collected and used in field trials.

2 STANDARDIZED CARCASS SEARCHES

The objective of the standardized carcass searches is to systematically search turbine locations for avian and bat fatalities that are attributable to collision with Project facilities or, in the case of bats, also due to barotrauma. Collectively, all turbine fatalities will be referred to as collision-related fatalities. The following subsections describe survey timing, the sampling design, and field procedures.

2.1 Sampling Duration and Intensity

Carcass searches will begin after construction is completed and the Project is operational, and will continue for one year. Post-construction monitoring will consist of systematic searches of 30 percent of the 87 turbines, for a total of 26 turbines. The subset of turbines to be monitored will

be a representative sample of available topographic and habitat variation at the Project. To be most efficient and encompass all potential Project impacts, survey effort will incorporate observed seasonal patterns in bird and bat use, and level of sampling will vary accordingly.

Seasonal sampling intervals will be as follows:

Spring: March 16 to May 31 – approximately 8 searches
Summer: June 1 to August 15 – approximately 8 searches
Fall: August 16 to November 15 – approximately 13 searches
Winter: November 16 to March 15 – approximately 11 searches

Surveys will be conducted every 7 days during spring and fall and every 10 days during summer and winter. One quality assurance/quality control (QA/QC) visit will be conducted during the year of surveys.

2.2 Search Plot Size and Configuration

The Project consists of 87 turbines. For this proposal, Tetra Tech assumes that turbines have a hub height of approximately 80 m (262 feet) with a total tip height of 130.5 m (428 feet). Tetra Tech will create a survey plot that is approximately 75 percent of the turbine tip height in width centered on the turbine. That is, the search area will extend 100 m (328 feet) from the turbines on each side to create a 200 m x 200 m search plot. Search areas will encompass maintained turbine pads and access roads, as well as adjacent unmaintained areas. The actual area searched will ultimately be dependent on the configuration of the maintained areas, as well as the portion of the unmaintained area that can be realistically searched as determined during initial surveys. Tetra Tech anticipates that the turbine pads will extend out to approximately 12 m (40 feet) from the base of turbines and roads will remain clear of vegetation.

During all seasons, linear transects will be established within search plots approximately 6 m (20 feet) apart and the searcher will walk along each transect searching both sides out to 3 m (10 feet) for fatalities. Personnel trained and tested in proper search techniques will conduct the carcass searches. The proposed protocol for documenting any fatalities or injuries is provided below.

2.3 Fatality Documentation

Carcasses found during standardized carcass searches will be labeled with a unique number, and searchers will record species, sex and age when possible, date and time collected, location (Global Positioning System [GPS] coordinate, and distance/direction from the turbine), condition (e.g., intact, scavenged, feather spot), observer, turbine number and any comments that may indicate cause of death. If a carcass of a listed species is found, searchers will follow the Project Wildlife Reporting System (Section 8.2) and contact the appropriate agencies.
Fatalities will be photographed as found and GPS locations will be plotted on a detailed map of the study area showing the location of the wind turbines. A copy of the field forms for each

carcass will be kept with the carcass at all times in a separate outer bag if the carcass is removed from the ground.

Carcasses of any special-status species will be handled as directed by USFWS or NDOW. Carcasses of non-listed species will be left in place and marked by trimming feathers, kept for searcher efficiency and/or carcass removal trials, or disposed of at an approved location, as appropriate. Individual carcasses collected during the study will be housed in a freezer on or near the Project site. Individual carcasses will be maintained until after the final analysis and report are prepared in case questions about identity or cause of death should arise. The final disposition of individual carcasses will be based on direction from the agencies, the legal status of individual fatalities, and direction of the USFWS Law Enforcement Agent in Charge, if appropriate.

Searchers may discover carcasses incidental to formal carcass searches (e.g., outside of a search plot or of a scheduled survey date). For each incidentally discovered carcass, the searcher will identify, photograph, and record data for the carcass as would be done for carcasses found during formal scheduled searches, but will code these carcasses as incidental discoveries.

3 CARCASS PERSISTENCE TRIALS

Carcass persistence is the disappearance of a carcass from the search area due to scavenging, predation, or other means (e.g., due to forces such as wind and rain or decomposition beyond recognition). The objective of the carcass persistence trials is to document the length of time carcasses remain in the search area, and thus are available to be found by searchers, and to subsequently determine the appropriate frequency of carcass searches within the search plots. As previously discussed, fatality searches must be conducted at a frequency that minimizes loss due to carcass removal in order to minimize bias. Seasonal differences in carcass persistence (i.e., changes in scavenger population density or type) and possible differences in the size of the animal being scavenged are taken into account when evaluating carcass persistence by conducting trials in multiple seasons.

Carcasses used in the trials will be selected to best represent the size and proportions for a range of species. For large birds, carcasses may include legally obtained waterfowl, pheasant, or similar species obtained from game farms. For small birds, carcasses may include European starlings, house sparrows, or similar species. For bats, carcasses may include black or grey mice that superficially resemble bats. Whenever possible, actual bird or bat carcasses of species expected to occur in the area will be used, including the carcasses of previously collected fatalities.

3.1 Sampling Intensity

Assuming adequate carcass availability, one carcass removal trial will be conducted during spring, summer, winter, and fall seasons with up to 15 carcasses of each bird size class (large

bird, small bird, bat/mouse) placed per season, resulting in a total of up to 135 trial carcasses used in carcass removal studies for the entire year for the Project. Trials will be spread throughout the year to incorporate the effects of varying weather, climatic conditions, and scavenger densities.

3.2 Conducting the Trial

Each carcass used for the carcass persistence trial will be placed randomly within the area beneath non-searched turbines. Random locations will be generated and loaded into a GPS as waypoints to allow the accurate placement of the carcasses by field personnel. Carcasses will be dropped from waist height and allowed to land in a random posture. Each trial carcass will be discreetly marked (e.g., small tag or wire wrapped around one leg) prior to dropping so that it can be identified as a study carcass if it is found by other searchers or wind facility personnel. Personnel will monitor the trial birds on days 1, 2, 3, 4, 7, 10, 14, 21, and 30. When checking the carcass, searchers will record the condition as intact (normal stages of decomposition), scavenged (feathers pulled out, chewed on, or parts missing), feather spot (only feathers left), or completely gone. Changes in carcass condition will be cataloged with pictures and detailed notes; photographs will be taken at placement and any time major changes have occurred. At the end of the 30-day period, any evidence of carcasses that remain will be removed and properly disposed of.

3.3 Estimation of Carcass Removal Rates and the Probability of Persisting

The mean carcass persistence will be derived from the carcass persistence trials and will be used to adjust the search interval. Estimates of the probability that a carcass was not removed in the interval between searches (probability of persistence) and therefore was available to be found by searchers, will be used to adjust carcass counts for removal bias (Huso 2011). Huso (2011) presents the most bias-free equation for determining the average probability of persistence, which takes into account the length of the search interval and the carcass persistence:

$$\hat{r} = \frac{\hat{\hat{t}}(I - e^{-I/\hat{\hat{t}}})}{I}$$

Where *t* is the estimated mean persistence time and *I* is the length of the interval.

4 SEARCHER EFFICIENCY TRIALS

The ability of searchers to detect carcasses is influenced by a number of factors including the skill of an individual searcher in finding the carcasses, the vegetation composition within the search area, and the characteristics of individual carcasses (e.g., body size, color). The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find. Estimates of searcher efficiency are then used to adjust carcass counts for detection bias. Searcher efficiency trials will be conducted all seasons for all searchers to account for seasonal differences in searcher efficiency.

4.1 Sampling Intensity

Searcher efficiency trials will begin when standardized carcass searches start. Personnel conducting the searches will not know when trials are conducted or the location of the efficiency-trial carcasses. Trials will be conducted multiple times throughout each season and will incorporate testing of each member of the field crew. At least 15 carcasses from both bird size classes (large and small) and bats or bat surrogates (mice) will be included in the trials.

4.2 Conducting the Trial

Carcasses will be placed at random locations within areas being searched prior to the carcass search on the same day. Carcasses will be dropped from waist height and allowed to land in a random posture. Each trial carcass will be discreetly marked (e.g., small tag or wire wrapped around one leg) prior to dropping so that it can be identified as a study carcass after it is found. The number and location of the carcasses found during the carcass search will be recorded. The number of carcasses placed prior to the search (i.e., the number available for detection during each trial) will be verified immediately after the trial by the person responsible for distributing the trial carcasses. Any carcasses not found will be collected after the trial.

4.3 Searcher Efficiency Rate Estimation

Searcher efficiency rates, or the probability of a carcass being observed given persistence, are expressed as p, the proportion of trial carcasses that are detected by searchers in the searcher efficiency trials. These rates will be estimated by carcass size (large bird, small bird, bat) and season.

5 FATALITY RATE ESTIMATION

The estimation of fatality rates will incorporate observed fatalities documented during standardized carcass searches, as well as unobserved mortality, or individuals that may have been killed by collisions with Project components but were not found by searchers for various reasons. Specifically, fatality estimates will take into account:

- search interval
- observed number of carcasses found during standardized searches during the monitoring year for which the cause of death can be attributed to facility operation
- carcass persistence, expressed as the probability that a carcass is expected to remain in the study area (persist) and be available for detection by the searchers during carcass removal trials
- searcher efficiency, expressed as the proportion of planted carcasses found by searchers during searcher efficiency trials.

To estimate fatalities, Tetra Tech will use the Huso estimator (Huso 2011) according to the following equation: $f_{ijk} = \frac{c_{ijk}}{p_{jk} * r_{jk} * v_{jk}}$ where f_{ijk} is the estimated fatality at the *i*th turbine during the *j*th search in the *k*th category and c_{ijk} is the observed number of carcasses at the *i*th turbine during the *j*th search in the *k*th category. The variable r_{jk} is a function of the average carcass persistence time, which was described earlier, and the length of the search interval preceding a carcass being discovered. The variable r_{jk} is calculated using the lower value of *I*, the actual search interval when a carcass is found or I, the effective search interval, and is estimated through searcher efficiency trials previously described. v_{jk} is the proportion of the effective search interval sampled where v = min (1, I I). p_{jk} is the estimated probablity that a carcass in the *k*th category that is available to be found will be found during the *j*th search. The variables $p_{jk,}$ $r_{jk,}$ and v_{jk} are assumed not to differ among turbines but can differ with carcass type, size class, and season. To obtain an estimate of the number of fatalities the following equation is used: $f = \frac{\sum_{i=1}^{12} \sum_{j=1}^{n_i} \sum_{k=1}^{3} f_{ijk}}{t}$ where n_i is the number of searches at turbine *i* (*i* = 1,…, n) and t is the effective number of turbines searched.

6 REPORTING

This monitoring study will summarize information on bird and bat fatalities associated with development of the Project. Seasonal reports will simply provide information on the search schedule and the species and number of each species found. The annual report will provide a summary of the carcasses found, searcher efficiency, carcass persistence and the total estimated fatalities for the Project. Any incident involving a federally listed threatened or endangered species or golden eagle will be reported to the USFWS within one business day of identification.

During the set-up for carcass surveys, a sweep survey will be conducted in order to remove any fatalities that occurred before the study is initiated. These fatalities will be summarized as incidental finds in the report, but will not be included in the overall fatality estimates. Based on previous experience managing post-construction monitoring field crews, there are a number of subtleties related to data collection that are best conveyed in-person by those involved in the data analysis, report preparation, and subsequent coordination and communication. These important lessons learned will be emphasized during the training to ensure a seamless transition between data collection, analysis, and reporting.

APPENDIX C. REPORT FORM

Wildlife Incident Monitoring and Reporting System - WIMRS

Completing and submitting this form is required by your sites Avian and Bat Protection Plan (ABPP). This form can also be found in your sites ABPP.

Instructions:

After completing the form to the best of your knowledge, attach a photo(s) of the bird/bat by using the button at the bottom of the form and then submitting by clicking the submit button. Multiple photos from different angles is best. The form will be delivered to the appropriate a Scientific Services biologist.

Note: Phone calls may also be required in addition to this form.

Wind Site: Select...

Briefly describe the incident if not a dead bird or bat (e.g. nest, sighting):

Observer(s): Phone Number:

Time: : Date:

City: County: State:

UTM Coordinates (Obtain from handheld GPS):

Zone: Easting: Northing: NAD:

OR

Latitude: Longitude:

OR

General Location on the Wind farm:

Nearest Turbine # Distance to nearest turbine:

Approximate direction from nearest turbine: Select...

INJURY OR MORTALITY OBSERVATION

Was this found: ☐ During a Scheduled Turbine Survey ☐ Incidental Find

How many photos were taken: elect...

Type of Incident: *(Check each that apply)*

☐ Bird ☐ Bat

☐ Live ☐ Fatality

If live: ☐ Euthanized ☐ Released ☐ Taken to Rehab. Facility

Carcass condition:

☐ Complete ☐ Partial ☐ Just Feathers ☐ Scavenged ☐ Fresh ☐ Decomposed

Additional Carcass Notes:

What is the species (if known):
Age (if known): ☐ Immature/Juvenile ☐ Adult ☐ Unknown
Estimated time of death (if known): ☐ < 1 day ☐ > 1 day

GENERAL HABITAT DESCRIPTION: Habitat Type/Vegetation Cover:
☐ Sagebrush ☐ Grassland ☐ Crops ☐ Grass ☐ Bare Ground *(road, gravel, dirt, etc.)*
☐ Large Rock/Boulders ☐ Shrubs/Brush ☐ Woods/Trees ☐ Other (describe)
Describe:

Additional Habitat Notes:

IF A HAZARDOUS NEST: Describe the situation:

BALD EAGLE and GOLDEN EAGLE: Do not bury or dispose of carcass. There are specific laws concerning eagles. Notify the site operational manager and contact Greg Aldrich at 704.430.7946 for all eagle incidents. If the primary contact is not available notify your secondary or EHS contact as soon as possible and wait for guidance.

DISPOSITION: (What you did with the bird, bat, carcass, nest, etc.)

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This section for use by Duke Energy Scientific Services personnel:

Wind Farm Code: elect...

Species Code: (if unknown use UNID for bird and UNBA for bats)

Incident ID:

Example Incident ID: 022311-TOTW-53-HOBA-1 (date - wind farm - nearest turbine # - species code - sequential number if more than one individual of same species found at turbine).

Additional Notes:

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le Attachment

Note: Remember to report this incident to your Operations Manager. If you need assistance, call or text Greg Aldrich at 704.430.7946.

APPENDIX D. POSTER

Wildlife Incident Monitoring and Reporting System (WIMRS)
Duke Energy Wind Facilities

Duke Energy is committed to protecting the environment and creating a sustainable future. This includes conserving and minimizing our impact on wildlife and their habitats.

The production of wind energy has the potential to harm wildlife resources. To reduce our environmental impact, the Wildlife Incident Monitoring and Reporting System (WIMRS) is designed to promote environmental responsibility and provide information to better manage wildlife issues.

About WIMRS

- **Incidental Observations** – Employees should be aware of their surroundings and observant of wildlife at wind sites, report any dead or injured wildlife and unusual wildlife encounters.
- **Turbine Surveys** – Trained site personnel conduct monthly turbine pad checks, including structured surveys around turbines and report any dead or injured wildlife found.
- **Environmental Services Inspections and Audits** – Biologists inspect/audit the sites as necessary to maintain a quality program.

Report all wildlife incidents to your site manager and the Duke Energy Wind Wildlife Hotline using the following guidance:

Call the Wildlife Hotline for the following:

- Dead or injured eagles, raptors or owls
- Any uncertainty about a rare, threatened, endangered or species of concern (RTE)
- A dead or injured RTE
- A sighting of an RTE that is not commonly seen at the site
- More than 3 dead or injured birds or bats found at a single turbine
- Any large scale fatality event at the site, e.g. 5 or more fatalities site wide
- Newly constructed raptor nests
- Old, historically inactive raptor nests that have recently become active
- Raptor activity at raptor nest structures or other manmade habitat enhancements

Complete the WIMRS form and submit with photographs for the following wildlife incidents:

- Incidental bird and bat fatalities, defined as a single fatality that does not meet a requirement described above
- Observations of fox or coyote dens, prairie dog towns (that didn't exist before), active nests that are not hazardous to operations, etc.

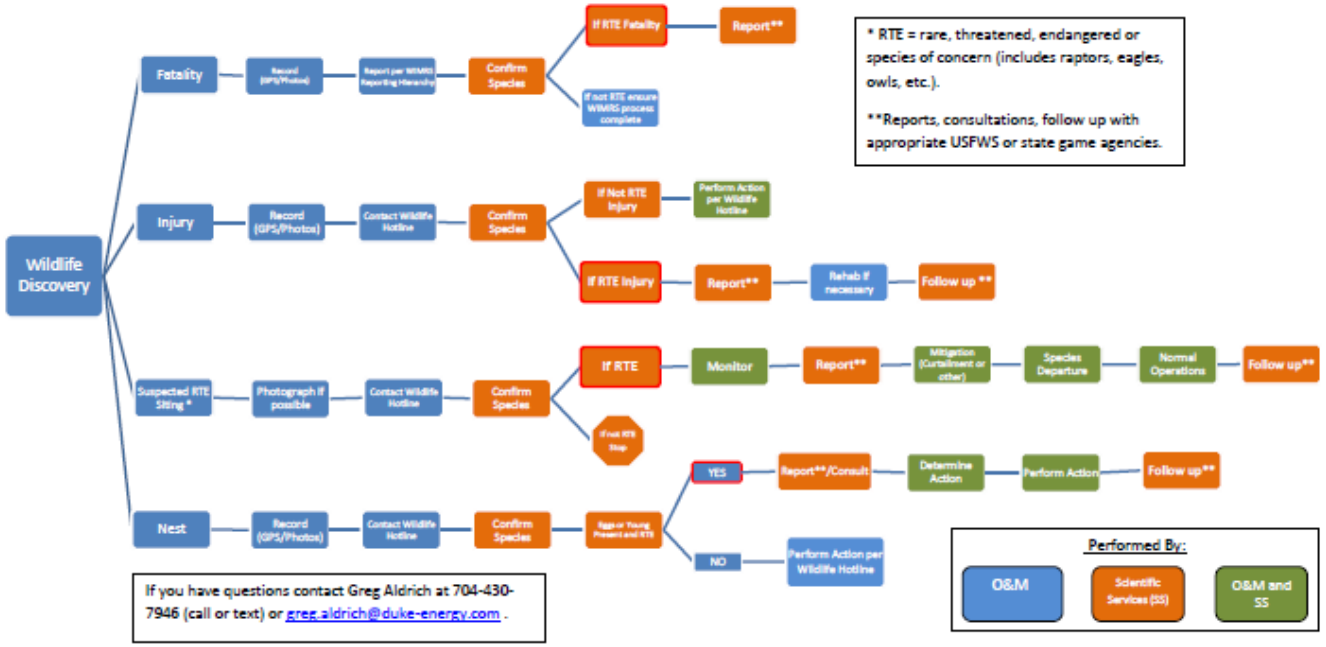
Primary Contact:	Secondary Contact:	EHS Contact:
Greg Aldrich	Scott Fletcher	Grayling Vander Velde
704-430-7946 (call or text)	704-956-1315	828-421-9205

APPENDIX E. FLOWCHART

Duke Energy Renewables

Wildlife Incident Monitoring and Reporting System (WIMRS) Flow Diagram

NOTE: A WIMRS report should accompany all wildlife incident reports.



If you have questions contact Greg Aldrich at 704-430-7946 (call or text) or greg.aldrich@duke-energy.com .